Economy and Environment Program
for Southeast Asia
Tanglin PO Box 101
Singapore 912404
Phone: (65) 6831-6854
Fax: (65) 6235-1849
E-mail: eepsea@idrc.org.sg
Web site: www.eepsea.org

RESEARCH REPORT

NO. 2003-RR5

Do Institutions Affect the Performance of Marine Protected Areas? Evidences from the Philippines

Ma. Esmyra Parado Javier, Resources, Environment and Economics Center for Studies Inc. (REECS), Suite 405 Tower at Emerald Square, P.Tuazon corner J.P. Rizal Sts. Project 4, Quezon City, Philippines 1109. (esmyra@email.com or reecs@skyinet.net)

This report investigates the effectiveness of different management regimes in the marine protected areas (MPAs) around the coast of the Philippines. It assesses how the MPAs are performing, from both an environmental and a social perspective, and finds out what constitute the key features of a successful management scheme. It finds that the type of institution in charge of an MPA makes little difference to its effectiveness. Instead, it finds that good leadership, adequate manpower & funds, and the provision of sustainable livelihoods are the key. The report suggests a number of ways in which community involvement in MPA management can be strengthened and highlights the need for community requirements to be taken fully into account in any MPA action plan.

Published by the Economy and Environment Program for Southeast Asia (EEPSEA)
Tanglin PO Box 101, Singapore 912404 (www.eepsea.org)
tel: +65-6235-1344, fax: +65-6235-1849, email: eepsea@idrc.org.sg

EEPSEA Research Reports are the outputs of research projects supported by the Economy and Environment Program for Southeast Asia. All have been peer reviewed and edited. In some cases, longer versions may be obtained from the author(s). The key findings of most *EEPSEA Research Reports* are condensed into *EEPSEA Policy Briefs*, available upon request. The Economy and Environment Program for Southeast Asia also publishes *EEPSEA Special Papers*, commissioned works with an emphasis on research methodology.

National Library of Canada cataloguing in publication data

Main entry under title :

Do institutions affect the performance of marine protected areas? :
evidences from the Philippines

(Research Report, ISSN 1608-5434, 2003-RR5)
Co-published by the International Development Research Centre.
Includes bibliographical references.
ISBN 1-55250-037-3

1. Marine parks and reserves – Economic aspects -- Philippines.
2. Marine parks and reserves – Social aspects – Philippines.
3. Fishery management -- Philippines.
I. Javier, Ma. Esmyra Parado.
II. Economy and Environment Program for Southeast Asia.
III. International Development Research Centre (Canada)
IV. Series: Research report (Economy and Environment Program for Southeast Asia) ; 2003-RR5.

QH91.75P45 2003 333.78‘09599 C2003-980151-9

Do Institutions Affect the Performance of Marine Protected Areas? Evidences from the Philippines

Ma. Esmyra Parado Javier

March, 2003

Comments should be sent to: Esmyra Parado Javier, Resources, Environment and Economics Center for Studies Inc. (REECS), Suite 405 Tower at Emerald Square, P.Tuazon corner J.P. Rizal Sts. Project 4, Quezon City, Philippines 1109. Tel. Nos. 632-439-6616/17

Email: esmyra@email.com or reecs@skyinet.net

EEPSEA was established in May 1993 to support research and training in environmental and resource economics. Its objective is to enhance local capacity to undertake the economic analysis of environmental problems and policies. It uses a networking approach, involving courses, meetings, technical support, access to literature and opportunities for comparative research. Member countries are Thailand, Malaysia, Indonesia, the Philippines, Vietnam, Cambodia, Lao PDR, China, Papua New Guinea and Sri Lanka.

EEPSEA is supported by the International Development Research Centre (IDRC); the Swedish International Development Cooperation Agency (Sida); and the Canadian International Development Agency (CIDA).

EEPSEA publications are also available online at http://www.eepsea.org.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to the following individuals and institutions whose assistance and contributions are invaluable in the completion of this report.

EEPSEA for its funding and unending support of this research, especially to Dr. David Glover and Ms. Cathy Ndiaye. Thank you for the opportunity.

Dr. Herminia A. Francisco, whose guidance, patience and contribution to this research is very much appreciated. Without her, this report would not have told its story.

Dr. Jack Ruitenbeek, my adviser on this research, whose comments are invaluable to the success of the study. Thank you for the support.

Ms. Lota A. Ygrubay and the staff of the Resources, Environment and Economics Center for Studies Inc. (REECS) for their administrative and technical assistance.

Dr. Jose E. Padilla, for the support and earlier comments on this paper, which proved to be very useful and Ms. Eugenia Bennagen for her experienced advice on everything.

WWF-Philippines for their assistance in local field surveys and for providing pertinent data for the study. Special thanks go to Mr. Manuel Mejia, Mr. Ajit Rye and Ms. Daisy Flores and the Silliman University, for the relevant information it has provided, specifically to Wednesday Gaudan and Bing.

The Local Government Units and Barangay Captains from the study sites, as well as the field staff of the Department of Environment and Natural Resources (DENR), and the Protected Area Superintendents (PASu), for all their assistance and support;

Ms. Gerly Espiritu-Ramos and Ms. Mary Grace Alindogan for the companionship and help in conducting the fieldwork for the study‘s survey;

Ms. Nikki Philline C. dela Rosa for her valuable ~~–in~~puts*”* to the paper,

To my family and circle of friends, who have never faltered in their support to all my endeavors,

And to those whom I have failed to mention, yet gratitude is due…. *Maraming Salamat!* May this research be an impetus for beautiful friendships and a source for effective environmental policy-making.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

Do Institutions Affect the Performance of Marine Protected Areas? Evidences from the Philippines

Ma. Esmyra Parado Javier

EXECUTIVE SUMMARY

Recognizing the need for more research on Marine Protected Areas (MPAs), this study analyses how governing institutions affect the performance of MPAs, using selected biophysical, socioeconomic and institutional indicators. The establishment of an MPA can be an effective tool for conservation. In the Philippines, the Department of Environment and Natural Resources (DENR), Local Government units (LGU) with Non-government Organization (NGO) partnerships and Peoples' Organizations (POs) are the dominant institutions that manage MPAs. The MPA sites chosen have a mixture of varying levels of involvement of these institutions. They include the Batanes Islands Protected Landscape and Seascape (BIPLAS), Siargao Islands Protected Landscape and Seascape (SIPLAS), Apo Reef Marine Natural Park (ARMNP), Sagay Marine Reserve (SMR), Tubbataha Reef Marine National Park (TRMNP), Panggangan Island (PI), Biri-Larosa Coastal Community (BLCC) and Apo Island Marine Sanctuary (AIMS). The study also inferred impacts of MPA by comparing before and after MPA situation based on key informants' account.

This study rated performance of MPA using selected socioeconomic, biophysical, and institutional indicators. The biophysical indicators showed that coral cover and the number of fish caught have dwindled in all sites, largely due to the El Niño event in 1997. The presence of MPA has brought about faster recovery of most biological resources in the study areas. The socioeconomic indicators showed that household income has not significantly changed over the years but environmental consciousness has increased in the community, enabling greater participation in resource management. The provision of alternative livelihood, introduced to the fisherfolk was unsatisfactory. A stronger livelihood program is essential to increase the probability of success of an MPA. The institutional aspect showed that illegal fishing activities have decreased and management boards are key factors for this success. The illegal fishing activities are often committed by nearby island communities of the Protected Area (PA), and it is vital to link up with a network of adjacent MPAs to help enforcement and monitoring activities.

The best governing institution was determined using a composite ranking of MPA. For the various MPAs, results yielded no statistical significant differences in performance across different institutional groups. These results indicate that regardless of the type of institution governing the PA, an MPA can perform well if its management is effective in implementing the conservation plan, strict in enforcing the laws and efficient in sourcing funds. Furthermore, regardless of who manages the resources, if the key elements for good management are present, the resource will be well protected and the people will be satisfied. The key elements for success are: good leadership, adequate manpower support for technical aspects and monitoring and enforcement, availability of funding support, and provision of livelihood support to the community. The performance ranking for all the MPAs is generally high, indicating the success of MPA as a conservation approach.

Generally, for a small area like AIMS, it is recommended that a Community-based Resource Management (CBRM) be established. For those with bigger areas of jurisdiction, like TRMNP and ARMNP, a co-management style (PO with DENR, LGU and NGO or combinations thereof) may be more effective as a bigger pool of resources is available for the different PA management activities. This study further emphasizes the importance of a sustainable alternative livelihood for the community that is appropriate to the sites' resources and its inclusion in management plans. A protected area (PA) will be more effective if coastal resources of nearby provinces and other islands are also well protected and well managed.

1.0 INTRODUCTION

Life on earth, the millions of plants, animals and microorganisms, the genes they contain and the intricate ecosystems they help build into the living environment, biological diversity is simply the end result of four billion years of evolution (World Wide Fund 1989).

The Convention on Biological Diversity defined biodiversity as *the variability among living organisms from all sources including inter-alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part of; this includes diversity within species, between species and/or ecosystems.*

Biodiversity is important to human society, with the varied roles and functions that it plays in both the ecological and economic systems. It is the source of food, medicine, raw materials and many environmental services to sustain life. According to McNeely (1988), biodiversity:

a) stabilizes hydrological functions, which relates to habitats and ecosystems as water catchments that regulates and stabilizes water runoff;

b) protects the soil, thus ensuring soil fertility and the productive capacity of the system;

c) stabilizes microclimatic conditions that suggests undisturbed ecosystems, like a forest, and helps maintain rainfall in its immediate vicinity by recycling water

vapor at a steady rate back into the atmosphere and by the canopy‘s effect in promoting atmospheric turbulence;

d) conserves renewable harvestable resources and protects genetic resources that may become a potential source of food, medicine and utilities;

e) preserves breeding stocks, population reservoirs and biological diversity, thus, maintaining the natural balance of the environment; and

f) supports tourism and recreation, thereby creating employment opportunities, and provides facilities for research, education and monitoring.

Biodiversity is found in several types of ecosystems like terrestrial, freshwater, coastal and marine ecosystems. Each ecosystem provides valuable products and services to man. A number of studies have been carried out on biological diversity in terrestrial ecosystems but relatively little has been done on coastal and marine ecosystems although the earth is 90% water.

The marine ecosystem is a source of food with its vast array of fish, seaweeds, crustaceans and other aquatic products. It is a primary mode of transportation, a major site for human settlements, a breeding ground and a habitat for marine species, and is greatly valued for its aesthetic value. Both livelihood and recreational values can be derived from this natural resource.

This ecosystem provides several ecological and economic uses. It is important because 59% of the Philippines‘ population lives in the coastal area. It is where 70% of 1,525 municipalities including 10 of the largest cities, are located.

Coastal and marine ecosystems play a major role in ecological and economic functions. However, its survival is continuously being threatened by both man-made and natural factors. It is imperative to protect this natural ecosystem and one of the popular methods is the establishment of Marine Protected Areas (MPAs).

MPAs as described by the World Conservation Union, is *any area of intertidal or subtidal terrain, together with its overlying water, and associated flora, fauna, historical and cultural features, which has been reserved by law to protect part or all of the enclosed environment.*

The MPAs‘ main objectives are (1) maintenance of biological diversity and ecological processes of marine and coastal ecosystems, (2) assurance that marine resources are used in a sustainable and equitable manner and (3) restoration of marine and coastal ecosystem where its functioning has been impaired. It is therefore an important tool for helping to conserve and restore marine ecosystem health.

Given the promise of MPAs, it is unfortunate that only less than half of 1% of the seas lie within MPAs. Most of these are poorly managed without financial resources. Global estimates by the World Wide Fund (WWF) stated that 70% to 80% of the MPAs are protected in name only and are not effectively and actively managed.

1.1 Statement of the Problem

Coastal and marine ecosystems and their diversity are continuously being threatened by both natural and man-made factors and one widely recognized way to conserve this ecosystem is through the creation of the site as a national protected area or what is operationally called MPA. The success of a MPA would depend on effective program implementation, strict enforcement of established rules, effective leadership, adequate financial resources, and a strong support of the coastal communities.

MPAs in the Philippines are generally governed by the national government through the Department of Environment and Natural Resources (DENR). In the past, the government has the sole responsibility to effectively manage and protect the country‘s natural resources. The current trend, however, is the devolution of management to certain interest groups, particularly non-government organizations (e.g. WWF, Conservation International (CI) and Haribon Foundation), local government units (LGUs), people‘s organizations (POs) or communities, and some private sectors.

The role of the Local Government Units (LGUs) as direct project implementers of resource conservation/management projects was brought to the forefront as a result of RA 7160 (1991) - the Local Government Code - which aims to decentralize governance from the national government to the LGUs. The dominant role and success of NGOs, often in collaboration with LGUs, in resource conservation is acknowledged by many institutions. NGOs' contribution has reached a wide scale of benefactors and often endowed with good funding and technical knowledge. The role of rural communities in the 1990s as managers of natural resources has also gained momentum. The sense of stewardship imparted among the members of the community has encouraged better resource management.

These institutions, however, are also faced with a number of shortcomings such as lack of financial and manpower resources, ineffective leadership skills and a complicated bureaucratic process. State-run initiatives such as the Protected Areas Management Board (PAMB) rely heavily on a bureaucratic process that slows down the implementation of various conservation initiatives. The LGUs may be ill equipped to act as resource managers since its main thrust is the administrative development of the local community, in terms of fund generation, infrastructure development and projects to increase welfare. For NGOs' management of MPAs, the organization may not have sufficient support from the community to effectively carry out its tasks similar to POs/community‘s difficulties in organizing due to its large membership. They often lack the technical skills and financial resources to effectively manage the natural resources.

Research studies that aim to provide data on how these different groups manage the natural resources and those that seek to evaluate their performances are useful to policy-makers in terms of planning and management of the country‘s natural resources.

1.2 Significance of the Study

The Philippines has always been one of the most biologically diverse coastal and marine regions in the world. It is to the country‘s interest to be able to determine the best approach in conserving this diversity. It is also in the interest of the public to be able to determine which governing institution is most effective in managing MPA. Few researches or none at all, have been conducted on the area. A few might have been evaluative studies but they are either non-comparative or have no consideration on property rights; hence this study aims to fill this gap.

Institutional arrangements are continually being established and redefined in order to determine and modify the scope and nature of the property regime over natural resources (Bromley 1991). It is in this context that property rights become tantamount to better natural resource management. As there are several types of property rights regime, an assessment of each regime‘s performance could result in improved management of the country‘s natural resources. The assessment would help determine what factors are critical to improve performance of the various sectors as well as identify the problem areas that need immediate solutions, both by resource managers and by policy-makers. It would identify the strengths and weaknesses of the various institutional groups, which other MPAs in the country may adopt to their advantage.

In determining the performance of the governing institution, the study also documented the different problem areas for consideration of management, highlighting the needs and insights of the members of the MPAs through a socioeconomic survey. The study put together the available data required for assessment, specifically biophysical information and tried to identify data gaps. The data gaps identified could become a take-off point for other researches, to further improve management of MPA in the country.

Finally, the method used for the comparative analysis of the governing institutions could serve as a model and framework for future evaluations of MPA. The performance indicators used in the study were tested for the first time in the field. The results from this study could serve as a catalyst for subsequent researches to further validate and field test the indicators.

1.3 Objectives of the Study

The main objective of the study is to determine the role of governing institutions in biodiversity conservation in selected Marine Protected Areas in the Philippines.

The specific objectives include:

1. comparing and contrasting the different management schemes existing in MPAs in the country with regards to the enforcement groups in the area, management skills, area of coverage, resources availability, technical expertise, leadership style and structure;

2. determining the performance of an MPA in terms of biodiversity conservation given specific indicators, which include species diversity and richness, number of habitats and the level of exploitation of resources in the area;

3. evaluating the MPAs' performance in terms of the socio-economic benefits it provided the household and the community;

4. documenting the views and opinions of the leaders and members of the community and other stakeholders on how their MPA can be better managed; and

5. providing recommendations based on results of analysis and suggestions from those interviewed on how MPA management can be improved.

1.4 Limits in the Scope of the Study

There are about 160 MPAs in the Philippines, divided into the following categories: national marine park (1), national marine reserve (1), marine turtle sanctuary (7), tourist zone and marine reserve (65), wilderness area (52), protected landscape/seascape (2), seashore park (1), and fish sanctuary (31) (WCMC 1998).

The scope of this study was initially limited to nine sites; with three study sites per institutional arrangement/governing institution. The Apo Reef Marine Natural Park (ARMNP), the Batanes Islands Protected Landscape and Seascape (BIPLAS) and the Siargao Islands Protected Landscape and Seascape (SIPLAS) represent the DENR/NGO managed MPAs. The Sagay Marine Reserve (SMR), the Sombrero Island (SI) and the Tubbataha Reef Marine National Park (TRMNP) represent the LGU/NGO run parks. The Sombrero Island was subsequently dropped as a study site due to the uncooperative attitude of the fisher folks. The Panggangan Island (PI), Biri Larosa Coastal Community (BLCC) and the Apo Island Marine Sanctuary (AIMS) are the community-based managed areas.

With climatic conditions to consider, the time spent for onsite surveys was limited. Thus, the study's goal to get a larger number of respondents was not met; only an average number of 43 respondents per site were obtained.

1.5 Hypotheses of the Study

The following hypotheses were tested:

1. The performance of a coastal area with an MPA is higher in terms of the level of biodiversity conservation than if the area is not an MPA.

2. The establishment of an MPA results in higher socioeconomic benefits to the coastal community.

3. The performance of MPAs under varying institutional arrangements depends on the financial resources, cooperation of the community members and the degree of enforcement of the MPAs rules and regulations by the governing institution.

4. The community-based resource management scheme produced better results in terms of biodiversity conservation and greater socioeconomic benefits than other management regimes.

2.0 LITERATURE REVIEW

Few studies were done on the evaluation of marine protected areas as a tool for biodiversity conservation and the sustainable use of resources. Likewise, very few studies relate the type of institutional arrangements with effective resource management.

2.1 Marine Protected Areas

According to the World Resources Institute (WRI 1999), the concept of Marine Protected Areas is relatively new. Limited information exists on its effectiveness. McNeill (1994) stated that the evaluation of a reserve‘s effectiveness is essential for increasing its conservation potential. There is really no methodology that explicitly evaluates reserves. However this does not negate the need for evaluation since many marine reserves lack management plans.

The Great Barrier Reef Marine Park Authority of Australia in 1995 was one of the first to assess the effectiveness of MPAs. The study showed that most MPAs are inadequate in protecting its area due to its geographical size. It was also discovered that marine ecosystems are less protected than terrestrial ecosystems. This scenario is referred to as *paper parks*, where rules and regulations are not enforced and proper resources are lacking.

WRI (1999) conducted a study of 383 MPAs in the world to measure management effectiveness. The study found that many are indeed *paper parks.* Confirming this

statement is the study by Chou (1998) on Southeast Asian Reefs – Status Update in 2000, which showed that MPAs in Southeast Asia occurred only on paper since government commitments on staffing and operational funds were limited. The results from resource monitoring done by volunteers exhibited very little differences in reef condition between reefs in marine parks and non-protected areas. This result verifies some observations that most MPAs do not meet management objectives.

The study by Kramer et al. (2000) stated that further studies on the effectiveness of MPAs as a conservation tool is needed in the North Central America region. Belize is so far the only area that has undertaken such a study. Generally, the performance was labeled as *"moderately satisfactory"* with the main problem on administration. Although, MPAs in this region have reduced human impacts on coral reefs, there are still some that lack the financial resources for management activities – further strengthening the criterion that some MPAs still remain as paper parks.

In South Asia, MPAs are also not well managed and there had been little improvement in the past five years. There is an existing weak management system, which lacks motivation, trained personnel, equipment and funding. The implementation of management plans is also poor or absent since some of the MPAs lack physical boundary markers like the Hikkaduwa Nature Reserve in Sri Lanka. (Rajasuriya et al. 1998)

2.2 Value of MPAs

Some studies have been carried out to measure the value of MPAs in terms of economic and/or ecological functions. Dixon and Scura (1994), in their Report, *Economic and Ecological Analysis of the Bonaire Marine Park*, estimated the benefits and costs associated with dive tourism, and the willingness to pay (WTP) for park protection. Their results showed a WTP value of USD 27.40 /diver per year as. It concluded that the dive tourism and the existence of the park were intrinsically linked, forming the cornerstone of the park's local economy.

Cesar (2000) conducted a similar study in Jamaica's Portland Bight. The study estimated that its net present value of incremental costs of management are at USD 19.2 million over a 25-year period and incremental benefits are at USD 52.6 million, with an optimistic tourism scenario and USD 40.8 million in a pessimistic tourism case. These figures translate to positive revenues ranging from USD 21.6 to USD 33.4 million for the national government and the local community.

In the Philippines, White et al. (1999) estimated a conservative value of USD 1.35 billion for the country's reefs. One km^2 of healthy reefs with tourism potential produces annual net revenues ranging from USD 29,400 to USD 113,000. White et al. also conducted the study in the Olango Island that estimated a net revenue of USD 38,300 to 63,000 per km^2 or a total of USD 1.53 to 2.54 million for the whole area. The study provided the national government a strong basis to invest in the management of reefs such as the Olango Island as improved reef quality and wetland stewardship could mean a 60% increase in annual net revenues from fisheries and tourism expenditures.

2.3 MPA Management

Gomez (1997) conducted a reef management study in the Philippines that looked into management and rehabilitation programs of marine ecosystems. Although the study was not able to do an assessment of the programs, it gave a description of the management schemes being carried out in the Philippines. He implied that national agencies in the country tended to be less effective in local management issues and that community management experiences were more successful.

More recently, a team from the Resources, Environment and Economics Center for Studies, Inc. conducted a study on the socio-economic assessment of ARMNP for the NGOs for Integrated Protected Areas (NIPA). The study found that the local community has a high level of environmental awareness. However, real household income has decreased slightly, from 1995 to 2001, the period when the park was declared an MPA. The ARMNP is a DENR/NGO managed site but the study did not particularly focus on the economic impact of institutions that managed the park.

Hanna and Munasinghe (1995) concluded that natural resource protection is very much related to property right regimes. It was stated that *"the knowledge of how property right regimes, as for particular types of institutions, function in relation to humans and their use of the environment is critical to the design and implementation of effective environmental protection."*

Zylicz (1995) conducted a study in the Northeastern part of Poland that enquired whether new property right regimes in Central and Eastern Europe served the purpose of nature conservation. Results of the study showed that co-management was the only viable strategy to integrate the diverse interests of local communities and stakeholders towards a more workable conservation effort. This result is further stressed by Ruddle (1994) in his study in the New Zealand Maori area that co-management is what is being currently practiced in most Asia-Pacific nations where central government lacks the capacity to manage fisheries comprehensively (Dasgupta and Maler 1994).

The appreciation of the usefulness of the different management schemes was well illustrated in the case of Bunaken National Park. It was stressed that a close collaboration between the national and the local government is imperative for the successful management of MPAs (IUCN 2000).

The management scheme of a private sector can have both positive and negative outcomes. An assessment done by Riedmiller (1998) on the Chumbe Island Coral Park illustrated this two-pronged result: private conservation can provide the community with substantial economic benefits and its hands-on approach can spell successful enforcement and monitoring but on the other hand, it could lead to high risk commercial usage that would threaten biodiversity.

Ruddle (1994) showed how community-based resource management had become a popular type of management in many countries. In Fiji for example, attempts had been made to increase the integration of traditional community-based management system with state law by seeking more formal Fijian ownership of Marine Parks. Papua New Guinea is also working on the devolution of enforcement rights to local owners.

This contention was further illustrated in a study by White and Trinidad (1998), which implied the importance of community involvement in MPAs. In cases where traditions and customs of the community are recognized and upheld, as in Oceania and part of North America, sustainable use of their resources is ensured.

The Balicasag Island Municipal Marine Park in the Philippines was also presented as a case where community resource management has resulted in an ideal model for resource conservation and sustainable use of resources.

3.0 CONCEPTUAL FRAMEWORK

The basic framework of this study is institutional and environmental economics in planning and management. The concept, in which this study relies on, is in the framework of property rights. The role that property rights play in the environment has transcended the rationale of transaction costs, externalities and the allocation of resources. According to Coase in his studies in 1960, in order to internalize the costs of externalities, property rights must be assigned (Cuevas 1999; Dasgupta and Maler 1994).

The four types of property rights are: (1) private property right assigning an individual the rights to legally and socially exclude others; (2) state property regime (*res publica)*, where the state has ownership and control over the area; (3) open access *(res nullius)* where there is an absence of a well-defined property right regime; and (4) common property *(res communis),* which represents private ownership by a group of individuals.[1]

It is in the study‘s interest to focus on the state property regime and the common property rights, as these are among the prevailing institutions in the study sites. In particular the ARMNP is primarily a state-run MPA while the AIMS falls under the common-property rights regime.

According to Bromley (1997), instate property regimes,the ownership and control over natural resource use and its management rest in the hands of the state through various government agencies. The management of the area is the primary responsibility of the government and institutions under it; however, it can mandate private organizations to practice such rights. These individuals or groups are given *usufruct rights* for a specified period of time while the use and access to resources are accorded to the community where the protected area is located.

[1] Individual/s in this context does not necessarily refer to a person, but may be an organization or corporation or any of the same entity.

Common property regime is similar to private ownership since it can exclude individuals from obtaining access to the resource. This common property regime can be easily translated to open access in the case of fisheries. Garrett Hardin (1968) studied this particular situation in 1968 in his famous article *Tragedy of the Commons.*[2]

There are five essential rights concerning property regimes; namely: (1) *access right*, which refers to the right to enter a defined property, (2) the *right of withdrawal*, which is the right to use the resource, (3) *the right to manage,* which is the right to regulate internal use patterns and transform the resources through improvements,(4) the *right to exclude*, which is the right to determine who will have an *access right* and how this may be transferred, and (5) the *right to alienate*, which is the right to sell or lease or both management and exclusion rights. The first two types are categorized as operational management rights, while the latter three are considered collective-choice property rights. (Schlager and Ostrom 1992; Cuevas 1999).

For this study, the institutional arrangement matrix was used to analyze the different management regimes prevailing in the various protected areas. The matrix is an application of the taxonomic approach to analyze problems from common property resource. The row vectors show the five rights and the column vector expresses the types of property regime as shown below:

	DENR –NGO Run-Property	*LGU – NGO Run-Property*	*Community Based Run–Property*
Use Rights	a_{11}	a_{12}	a_{13}
Exchange Rights	a_{21}	a_{22}	a_{23}
Distribution Rights	a_{31}	a_{32}	a_{33}
Management Rights	a_{41}	a_{42}	a_{43}
Rights to Authority	a_{51}	a_{52}	a_{53}

The element of a_{ij} determines the types of rights, which is the i^{th} (i=1…m) case for the j^{th} (j=1…3) institutional arrangement. Entry in a_{11} defining use rights for DENR/NGO managed site shows information on how resources can be used or withdrawn. The institutional arrangement in this site could refer to imposition of license fees for resource regulation. The entry in the cell therefore relates to specific monetary values, which imply that individuals can only withdraw or use the resource by paying the imposed fees. Management institutions may also impose use-zone areas to regulate resource use, such as no-take zones, where individuals cannot withdraw the resource for any purpose. Thus, the entries in the matrix can either be qualitative or quantitative in nature or both, depending on the type of institutional arrangements and the types of rights assigned to the holder of the rights.

[2] It is useful to note that in any type of property regime, a failure to carry out its rights translates to open access regime.

The matrix shows the different types of property rights existing in each institutional arrangement. The analysis can lead to generalizations showing conflict or harmony in areas of ownership such as in use rights. For example, the imposition of no-take zones can impinge on the source of livelihood of local communities resulting in a conflict between the goals of biodiversity conservation and the provision of livelihood source. The managing institutions can perhaps resolve this through alternative livelihood programs such as seaweed farming. Management institutions of each site may, of course, have different ways of resolving conflict, but what is imperative is its resolution, as it will determine the success or failure of MPA management.

Furthermore, the assignment of management and enforcement rights can influence individual behavior in terms of how cooperative or un-cooperative a person can be, thus affecting the level of biodiversity conservation or perhaps the degree of exploitation it can manifest. An individual will tend to have an un-cooperative behavior when assigned user fees or if licenses are too high and/or punishments for violating the rules in the MPAs are too severe. The choices of the community members in the use of the resource are therefore dependent on the number of rights accorded to them.

Besides filling-up the institutional arrangement matrix, key performance indicators were also used in the study to help measure the impacts of management schemes on the performance of the MPA in its biodiversity, socioeconomic or institutional aspects. The measurements for these indicators were used to derive a ranking of criteria that can be used in evaluating MPAs and at the same time result in a composite index that will help determine the best MPA among the study sites. This composite index was determined through the arbitrary ranking of selected key performance indicators as ranked according to highest value (a scale of five) and lowest value (a scale of one).

Figure 1 presents the flow of data analysis of the study. It shows how management institutions influence an MPA's performance. In MPA management, partnerships for co-management are often forged between government institutions and an NGO. In the cases of BIPLAS, SIPLAS and ARMNP, it is a partnership between DENR and an NGO; for SMR and TRMNP, it is between the LGU and an NGO. PI, BLCC and AIMS are managed by the community.

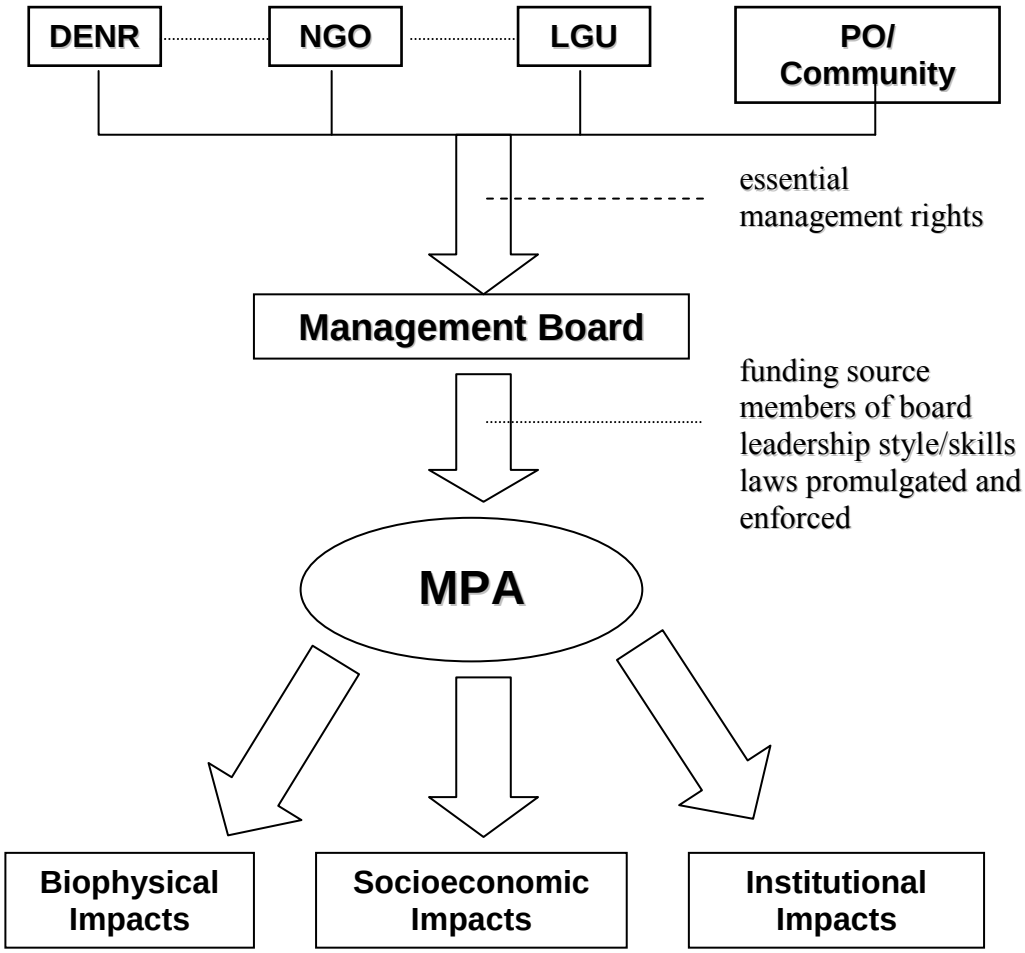

Figure 1. Analytical Framework

In governing MPAs, certain rights are defined to better help management, as illustrated in the institutional arrangement matrix. A management combined with reliable funding source, strict law enforcement and effective delegation of responsibilities defines the success of an MPA. Impacts on the biophysical aspects are interrelated since success in one factor has consequent effects on socioeconomic performance; and good institutional management consequently affects biophysical and/or socioeconomic performance.

4.0 METHODOLOGY

4.1 Data Collection Strategies

The information used for the study was derived using the following approaches:

a. Secondary data collection primarily from existing literature and research studies found in the management offices of each of the sites. Researches conducted by DENR through Conservation of Priority Protected Area (CPPAP) and Protected Area Management Board (PAMB), and other NGOs that include the WWF-Philippines, and NIPA, and other research institutions including the academe, were used in the study.

b. Key Informant Interviews were conducted with representatives from the DENR, who were either the PASu or PENRO, from the LGU, local NGOs, officers of People Organizations (POs) and other PAMB members.

c. Household Surveys through personal interviews were also conducted. The study concentrated on fisherfolk households.

4.2 The Study Sites

Study sites were chosen for the following reasons:

a. *high biodiversity richness;* whether it is rich in biodiversity, and has a coral species range of 40 to 60, including a number of flora and fauna species.

b. *active management committees;* whether the site has an active management board that effectively oversees the marine parks with most of its members participating in its endeavors.

c. *significance of the sites*; whether the site is among the best in coastal and marine ecosystems in the country, in terms of its biological diversity and economic value to the country; for example, The Tubbataha Reef Marine National Park, a World Heritage Site declared by the IUCN – The World Conservation Union.

d. *amount of data available;* whether the site has an abundance of existing independent studies regarding the different aspects of the MPA, to facilitate the need of the study for secondary data collection.

e. *development of ecotourism in the area*; which is an important consideration as it is an indicator for sustainability. Ecotourism has a dual purpose - resource conservation and economic improvement.

f. *availability of relatively stable fund resources;* whether the site is fully funded for a specified number of years by both local initiatives and foreign aid assistance.

The existing stability of financial resources contributes to the homogeneity of the sites. This will not alter different management capability.

All of the chosen study sites have met the aforementioned criteria

4.2.1 DENR/NGO led MPAs

Batanes Islands Protected Landscape and Seascape (BIPLAS) has an exceptionally beautiful landscape and seascape, often compared to the terrain of Scotland and Ireland. BIPLAS is the smallest province in the Philippines and is at its northernmost tip. It has an area of 213,578 ha and was proclaimed a protected area in February 1994 by virtue of Presidential Proclamation No. 335. It consists of 10 islands and islets, and the total population is 14,026. Ivatans, the local people, are mainly engaged in fishing and farming. BIPLAS currently faces encroachment of commercial fishing boats as one of its major problems.

The DENR is primarily responsible for managing BIPLAS through the Conservation of Priority Protected Areas Project (CPPAP). There are three NGOs in BIPLAS namely the Batanes Development Foundation Inc. (BDFI), the Itbayat Integrated Area Development Program (IADP), and the Ivatan Heritage Foundation. People‘s Organizations (POs) also participate in conservation efforts.

Siargao Islands Protected Landscape and Seascape (SIPLAS) is endowed with white sandy beaches, hidden lagoons, caves, deep water teeming with a plethora of marine life and islets. Siargao Islands, an area of national and ecological significance, has the biggest mangrove reserve in Mindanao covering 8,692 ha. SIPLAS is part of the province of Surigao del Norte. It has a total population of 82,113. With an area of 278,914 ha, it was declared a protected landscape and seascape in October 10, 1996 through Presidential Proclamation No. 902.

Besides fishing, many of the Siargao locals are employed in local government and small trade establishments. Other sources of livelihood are farming, livestock and poultry-raising, wood-gathering, trading and contract labor.

The management of SIPLAS is led by the DENR through the Conservation of Priority Protected Areas Project (CPPAP). The Surigao Economic Development Foundation Inc. (SEDF) is the area‘s local NGO. There are presently several POs in the area that SEDF helped organize.

Apo Reef Marine Natural Park (ARMNP) is one of the largest coral atolls in the country. It has an area of 15,792 ha and was created in September 6, 1996 through Presidential Proclamation (PP) No. 868. The ARMNP is under the jurisdiction of the Municipality of Sablayan, Mindoro Occidental and is a DENR-NGO managed site. It has a total population of 63,685 (in year 2000) and five people stay on the reef island to patrol the

area and protect it against illegal activities. Most of the people living in the municipality are engaged in agriculture, fishing and commerce. Current conditions show a loss in coral cover and a 30 - 50% drop in nesting activities of Nicobar Pigeons in the area. Prevalent illegal fishing, coral poaching, rats and cats‘ infestation, destructive anchoring, and intense extraction of marine resources as food baskets, currently threaten this MPA.

The management of the ARMNP is mainly led by the DENR, through its Conservation of Priority Protected Areas Project (CPPAP), in close collaboration with the NGOs for Integrated Protected Area (NIPA). Recently, the World Wide Fund for Nature Philippines (WWF) donated monitoring equipment and patrol boats and currently assists in the enforcement activities.

The management of the ARMNP was assigned to the office of the Protected Areas Superintendent (PASu) and the Host NGO (HNGO), formerly represented by the Philippine Ecumenical Action for Community Enlightenment (PEACE) Foundation within the period 1994 to 1999 until NIPA, Inc. took over. The HNGO is often in charge of socioeconomic development activities which include information and education campaigns.

4.2.2 LGU/NGO led MPAs

Sagay Marine Reserve (SMR) is situated at the Northeast tip of Negros Island. It is in the Visayan Sea and is about five kilometers from the coastal town of Old Sagay. With an area of 31,000 ha, it was declared a reserve on June 1, 1995. SMR, with a total population of 141,057, is under the jurisdiction of Sagay City, Negros Occidental. Most of the people living here are engaged in fishing, livestock-raising and farming. Illegal fishing methods such as dynamite blasting, use of cyanide and fine mesh nets and commercial fishing are still rampant in the area but the LGU is determined to eventually abate all these through strict law enforcement and regular patrolling of the area.

The management of Sagay Marine Reserve, recently placed under the NIPAS Act, has a PAMB. The Sagay City mayor rather than the usual DENR-RED, chair the PAMB for SMR. POs are present in the area, which the LGU believes serves as catalysts in the development of the rural areas, particularly in securing the community‘s participation in the decision-making process and in amplifying their role in environmental protection.

Tubbataha Reef Marine National Park (TRMNP) is situated in the middle of the Sulu Sea and is the country‘s first National Marine Park. Tubbataha Reef is under the jurisdiction of the Municipality of Cagayancillo Island in Palawan and is an LGU-NGO managed protected area. There are about 6,348 (in year 2000) people living in its group of islands with eight park rangers inhabiting the reefs‘ north Islet. The inhabitants of Cagayancillo are engaged in fishing and seaweed farming. Although, TRMNP still has a rich coral cover, there has been a significant decrease in its size, which could be caused by the prevalence of illegal fishing by the local people and poaching by commercial fisherfolk, which includes non-citizens like Taiwanese.

The Protected Areas Management Board (PAMB) chaired by the provincial governor is currently managing the TRMNP. Contrary to the official set-up of a PAMB, the governor has been in-charge of the board since its establishment. This was brought about by a Memorandum of Agreement (MOA) signed between the office of the governor and DENR during the early stages of the park's establishment. This only proves the LGU's commitment in protecting its territorial waters. Currently, the (LGU), together with the WWF-Philippines is actively engaged in managing the area through enforcement and community organizing activities.

4.2.3 Community-based Managed MPA

Panggangan Island (PI) is known for its mangrove forests and natural scenic attraction. It has a total area of 1,040 ha and was initially declared as a Mangrove Swamp Forest Reserve on December 20, 1981 by virtue of Presidential Proclamation No. 2152. PI is under the jurisdiction of the Municipality of Calape in the province of Bohol, which has a total population of 4,213. With the initiative from the local PO, the Lomboy Farmers, Fishers and Carpenters Association created two marine sanctuaries where fishing and any other related activities were strictly prohibited. The fish sanctuaries were created on March 1995. Incidences of the use of destructive fishing methods have currently ceased in the whole area

The community through POs in the island leads the management of the Lomboy/Cahayag Fish Sanctuaries with the guidance and support of their barangay[3] captains. The Bohol Integrated Development Foundation (BIDF) is the local NGO that assists the community in its conservation efforts.

Biri-Larosa Coastal Community (BLCC) comprised of the municipalities of Biri Island, Lavezares, Rosario and San Jose, which are located on the northern tip of Samar Province. It has an area of 35,000 ha and was declared a PA on April 23, 2000 by virtue of Proclamation Number 291. The total population in the area is 50,740. The main source of livelihood is fishing although farming activities are also present. Illegal fishing practices, continuous conversion of mangrove forests into fish ponds and residential areas, and evident water pollution are the most pressing problems in BLCC.

Currently, the management of BLCC is a collaborative effort between the DENR through its Coastal Environmental Program (CEP), the Samar Center for Rural Education and Development (SACRED), a local NGO and with some assistance from an academe, the University of the Eastern Philippines. These institutions aim to develop further the community‘s capabilities to manage the area, even though some POs are already active in conservation management projects.

[3] barangay refers to a small unit of a town in the Philippines

Apo Island Marine Sanctuary (AIMS) is a 74 ha volcanic island found in the Visayan Sea, surrounded by a spectacular and diverse fringing coral. It was established in 1982 as a community-based managed protected area with a strict marine sanctuary. The marine sanctuary, a 500-meter stretch of prime reef in the South East side was created in 1985. On August 9, 1994 the island was proclaimed a National Integrated Protected Area System (NIPAS) site, through Presidential Proclamation Number 438. The area is under the jurisdiction of the Municipality of Dauin, Negros Oriental and is a community-based managed protected area. It has a population of 21,077 (in year 2000), with 600 of the people living on the island itself. The community is actively engaged in fishing, pump-boat operation and vending activities for their livelihood. Currently, the area is faced with continuous marine resource degradation as well as vegetative cover denudation caused by illegal fishing activities such as use of dynamites, unmonitored anchorage, and unregulated SCUBA diving activities. The increasing use of fish traps in the area may eventually result in coral reef disturbance and subsequent destruction.

AIMS was managed by a community organization since 1985 through the Marine Management Committee (MMC) with assistance from Silliman University. The MMC was responsible for the upkeep and enforcement of the marine reserve until 1994. It was subsequently abolished with the entry of PAMB. As mandated by the NIPAS Act, PAMB is given assistance by CENRO-DENR and is currently chaired by the DENR-RED.

4.3 Data Analysis

One of the objectives of the study was to analyze the performance of the different management schemes using key performance indicators as a basis. The key indicator parameters were categorized into three, namely: the biological, the socioeconomic and the institutional indicators.

A *with or without MPA* approach was used in analyzing the data using the key performance indicators. The estimates were gathered from existing literature, describing relevant data when the area was not yet an MPA and when it became one. However in cases where there were no data, the study relied on the recollection of the respondents and key informants‘ interviews.

A multi-level analysis was conducted on the household, community and park area. One of the study's hypotheses is that the establishment of an MPA in a given site would have different effects at all levels; henceforth, performance was assessed at each level to validate the hypothesis.

Biodiversity level indicators were measured and summarized for all levels. These were used to observe the changes in resources, which included: a) area-specific species, measured through listing and number/frequency; b) habitats (sea grass beds, mangroves, coral reefs, others), which were measured through listing, area extent/location, species composition/density and condition of habitats (percentage of damage); and c) level of exploitation, through presence/absence of prohibited/destructive fishing methods and violations of resource use as stated in management plans.

Biodiversity indicators at the household levels include the respondents‘ perceptions based on their observations and experiences in relation to their occupation (i.e. fisherfolk). For data that were not available for some aspects of the biophysical indicators, the study relied on *“keystone”* species for inspecting reef health and changes in biodiversity level.

In terms of socioeconomic indicators, for the transaction cost variable, it is important to note that this study only intended to measure values as given by costs generated from promotion of the MPA‘s goals through information dissemination, communication and enforcement costs in terms of materials distributed, meetings, seminars/workshops, and management and enforcement costs. A comprehensive measurement of this aspect could be considered another study altogether, but the author acknowledges that this aspect is very important to determine the effectiveness of an institutional arrangement, as transaction costs are culturally specific – one person‘s tedious meeting (a cost) may perhaps be another‘s enjoyable activity (a benefit).

To further enhance the analysis, institutional indicators were also determined. These would include the types and lists of laws formulated and enforced in the MPAs, type of enforcement and the kind of management boards. The level of liability was also assessed, through identification of punishments accorded to the violators of the PA's laws and regulations. The views and ideas of the respondents and key informants comprised one aspect of the questionnaire.

The questionnaire also sought opinions of the respondents on the general performance of the MPAs in terms of biodiversity conservation and its socioeconomic benefits, as well as their perspectives on the contributing factors to the success or failure of the management regime. This aspect of the study is important for policy-makers to become knowledgeable on local issues to aid them in decision-making and policy formulation.

To consider the different time frames when the study sites were declared as a marine protected area, the study compared the values of the key performance indicators in terms of percentage changes, to support the results in determining the most effective institutional arrangement, when applicable.

In the final analysis, a composite measure of accomplishments that include biophysical, socioeconomic and institutional indicators was derived using Multi-criteria Analysis (MCA). MCA entails the solution of decision problems that involve multiple (generally conflicting) objectives (Zoints 1992). It entails asking representatives from different key institutions, to rank the given performance indicators.

5.0 RESULTS AND DISCUSSION

5.1 Institutional Arrangement Matrix

Tables 1a to 1c present the differences and similarities of the types of rights that are practiced under the three-governing institutions analyzed. The institutional arrangement matrix, albeit very descriptive, aids in the analysis of the link between property systems and environmental conservation and its sustainable use. The different rights listed in the table refer to the five essential management rights. This study tried to define these five rights as applicable and as practiced by the different institutional arrangements found in each of the site.

The information presented in the tables was derived from the different management plans of the MPAs and were fitted for each of the rights defined. A liability clause was included in the matrix. This was done with the realization that these rights were keenly being practiced and enforced by the management. Thus it would be of importance to mention how perpetrators or violators were dealt with.

5.1.1 Use Rights

This refers to the right to withdraw resources for different purposes like for food or commercial use. The matrix shows use rights are often exercised with the use of economic instruments such as license and user fees. All the institutions utilized these instruments to regulate resource use although not for all study sites. The use of such instruments averts a situation that can be described as an *open-access regime;* a system, which often leads to an unsustainable use of resource, as individuals may tend to continuously extract resources without regard to available stock. The use of fees therefore regulates resource extraction to a more sustainable use-level and those that pay these fees are bestowed a certain level of use rights, such as utilization of resources.

The MPAs belonging to the DENR/NGO employ economic instruments while those in the LGU/NGO and community-based managed sites (TRMNP and AIMS) charge license and user fees. Although BIPLAS does not charge any user fee, it assigns researchers visiting the area at PHP 200 (USD 4)/researcher. SIPLAS charges research fees as well at PHP 40 (USD 0.8)/local per day and PHP 100 (USD 2)/foreigner per day. SIPLAS charges other fees as well, like for docking, filming and sport fishing, at PHP 200 (USD 4)/boat, PHP 1,500 (USD 30)/day and PHP 45 (USD 0.9) /rod, respectively. Fishing activities in the ARMNP is generally restricted unless a fisherman has acquired a fishing license from the local government office, which could cost him PHP 1,000 (USD 20)/year. The license is applicable to the individual or to his vessel. Upon acquiring the fishing license, fisherfolk may engage in fishing activities in the protected area‘s *Sustainable Use Zone.* As for ecotourists, leisure activities are allowed in PAMB-designated *Recreational Zones* while scuba enthusiasts pay a diving fee of PHP 300 (USD 6) per visit.

For LGU/NGO sites, license fees in TRMNP are not applicable since it is a no-take zone. With regard to user fees, the management board charges around PHP 2,500 (USD 50)/diver per visit for foreigners and PHP 1, 250 (USD 25) for local scuba divers during their first visit. The aforementioned fees are pegged at 50% less for the next consecutive visits to Tubbataha Reef. For SMR, no user fees are charged.

For the community-based managed site of AIMS, no fishing licenses are required; fisherfolk are allowed to use sustainable methods only, like the hook and line, fish nets and fish cages. This practice is closely monitored by the *bantay dagat* and almost none of the fisherfolk are engaged in the use of illegal methods. User fees for AIMS are set at a lower amount of PHP 150 (USD 3)/diver, if the activity conducted is within the sanctuary and PHP 75 (USD1.5)/diver if it is outside the sanctuary but within the PA. The other two sites of PI and BLCC have not taken any steps yet in incorporating economic instruments for resource management.

Ecotourists visiting any of the sites are only allowed to enjoy the surroundings and take photographs, but are not allowed to gather any marine species from all designated zones. Among the eight sites, only AIMS charge a fee of PHP 50 (USD 1) for the use of an underwater camera.

It is important to note that the management institutions, with the exception of TRMNP, arbitrarily set these user fees. The user fees in TRMNP were a result of a Willingness-To-Pay study done by the World Wide Fund (WWF) Philippines. Thus, for the other sites it cannot be determined whether the assigned fees reflect the true value of the resource.

5.1.2 Exchange Rights

The transferability or non-transferability of fees determines how exchange rights are practiced. Exchange rights, therefore, refer to the right to decide on how use rights are to be transferred.

Exchange rights for license fees are non-transferable while user fees are transferable. This exchange right is practiced by management institutions for all sites. License fees for all sites, where applicable, are issued either to the fisherman or to his vessel and cannot be used by anyone other than the name of the person or vessel the license is issued to. The tourists/visitors such as scuba divers and sightseers pay the user fees, which are transferable to other users. For example, someone who initially planned to scuba dive but decided not to may ~~"t~~ransfer" his use right to another diver who has not yet paid the user fee. This is being practiced in all the study sites.

5.1.3 Distribution Rights

This refers to the right to allot resources for extraction and use. Distribution rights for the sites prescribe the amount and kind of resources that can be allotted for intended users. This regulates what species can be gathered and what cannot, where to gather the species, how to gather it and who are allowed to gather specified species. The tendency of the MPAs in the study is to totally restrict gathering of endangered, threatened and rare species. In terms of methods employed for gathering species, only sustainable fishing methods are allowed such as the hook and line and fishnets. Scientists and researchers may be allowed to gather specific species for research purposes as results may aid in policy-making as well as provide input for management.

To illustrate, distribution rights for DENR/NGO sites, fisherfolk in ARMNP who do not have a fishing license can only gather marine species in the designated *payao* area and those with license may gather within the reserve as long as the species are not threatened, endangered and are not rare. Those who violate such policies are subjected to penalties, namely: a fine of not less that PHP 5,000 (USD 100) but not more than PHP 100,000 (USD 2000) and /or imprisonment of not less than one year but not more than three years, as implemented by PAMB. For both BIPLAS and SIPLAS, a similar scheme is employed. Although these sites do not employ license fees, locals may only fish at sustainable levels. The LGU/NGO managed site of TRMNP, however, does not allow any form of species collection within its boundaries even if the species are abundant. The SMR allows only hook and line fisherfolk within the reserve. In the strict marine sanctuary of the community-based AIMS, any collection and extraction of marine species is prohibited. Within it, fishing activity can be conducted except for leisure activities such as scuba diving and snorkeling, with a limit of 15 divers within the sanctuary per day. Commercial fishing is not allowed; only sustainable fishing methods including fish cages are permitted within the protected area. For the PI and BLCC, well-defined restrictions are yet to be set.

5.1.4 Management Rights

This refers to the right to regulate internal use patterns and transform resource through improvements. This particular right is often bestowed upon the PAMB, but different individuals from different institutions such as members of the LGU can spearhead their own management board.

For DENR/NGO managed sites**,** the DENR PAMB has the right to manage the resource and enforce the laws and regulations governing it. However, there are MPAs where host-NGOs play active roles. In ARMNP for example, NGOs for Integrated Protected Area, Inc. or NIPA, Inc. played an active role in managing the area. The management allows licensed fisherfolk to fish only in the *Sustainable Use Zone*. Open and close seasons for selected species are implemented and there are set sizes and bag limits for some species. Although this was written down in the management plan, no mention was made as to what particular species these limits were applicable to. In this zone, only low impact aqua sport like scuba diving and sport fishing are allowed.

Although TRMNP is governed by PAMB, the marine park is actively managed by the local government unit, through the office of the provincial governor in partnership with WWF-Philippines. An NGO, WWF is very much involved in promoting alternative livelihoods such as seaweed farming. PAMB headed by the provincial governor, instead of the traditional DENR- RED, monitors and supervises the activities in the area. Park rangers are stationed in an islet on regular rotations. For SMR, the PAMB is also currently being led by an LGU official, in the capacity of the municipal mayor of Sagay.

For management rights in AIMS, the members of the community have been managing the area for more than a decade through the Marine Management Committee, a local community organization. Recently, the Island was put under the Coastal Environment Program (CEP) of the DENR. The MPA is now managed by PAMB, which tries to regulate resource use and formulate conservation management plans. For PI and BLCC, the CEP-DENR is currently managing the area, which aims to encourage community participation in sustainable resource management.

In terms of differences in the management of the area, TRMNP still remains a no-take zone, which explains the community‘s level of hostility towards the TRMNP management. This animosity is manifested through the uncooperative behavior of most locals. The implementation of PA rules and regulations by the local government in Cagayancillo has been very lenient. Only verbal warnings have been issued to fisherfolk engaged in illegal activities. The same goes for the members of the community who are silent even if the illegal fisherfolk are well known and are openly identified by the locals. On the other hand, there were no forms of hostility or opposition towards the management in AIMS at the time the community was managing the PA. But with the PAMB currently managing the area, members of the community have become hostile towards its management practices and are not as cooperative as before. This is mainly due to the 75% share from the Integrated Protected Area Fund (IPAF) for the management of the PA and the community, which remained unreleased for the past two years.

For ARMNP, the dissatisfaction of local fisherfolk with PAMB is brewing due to the implementation of license fee requirement for fisherfolk who wish to fish within the ARMNP waters. The fisherfolk feel that charging PHP 1,000 (USD 20) per year is too steep for their budget and they are not happy to fish in the *payao* area set-up for them since the distance is too far from the Sablayan community.

5.1.5 Rights to Authority

This particular right refers to the right to enforce existing rules and law. Rights to authority are often exercised by those in charge of patrolling and law enforcement in the MPA such as the *bantay dagat* volunteers, coast guards and park rangers. They are often the ones assigned to protect and guard the vicinity of the park and enforce all its laws.

For DENR/NGO sites, the office of the Protected Area Superintendent (PASu) has the right to monitor and supervise the activities in the area. There are park rangers and *bantay dagat* patrolling the areas. Fisherfolk, scuba divers or any individual engaged in any form of illegal activities, when caught are subjected to different penalties, including possible imprisonment, as prescribed by law.

With respect to who monitors and patrols the area, the community-based sites like AIMS employs people from the community, i.e. local fisherfolk, compared with DENR/NGO and LGU/NGO sites with people from the Philippines National Police, Philippine Coast Guard and Park Rangers as enforcers. WWF is also active in patrolling the area in TRMNP and is currently training locals in ARMNP on enforcement activities. It can be implied therefore that the dedication and sense of stewardship of the patrollers of AIMS and at a certain degree in PI and BLCC, is higher than the patrollers from the other sites, since community managed MPAs employ fisherfolk from the community - the same community that directly benefits from the island‘s resources for their source of livelihood. However, this scenario no longer stands for AIMS. In the past, the *bantay dagat* was on a voluntary basis with people in the community doing it without compensation but with the entry of PAMB, the volunteers are now being paid as regular employees by the DENR.

On a historical note, even before the establishment of AIMS as an MPA, the Silliman University has always assisted the community through environmental education and provision of alternative livelihood. When the community in Apo Island established a sanctuary, the University's participation was extended to monitoring and enforcement. This community effort became a catalyst for the creation of the whole Apo Island into a Marine Protected Area. However, with the entry of the PAMB in the area, problems pertaining to the dissemination of benefits resulted. The unreleased 75% of the IPAF have solicited widespread criticisms from Silliman University and uncooperative behavior from the community. One concrete manifestation of this behavior is the unwillingness of the *bantay dagat* members to continue patrolling the area.

5.2 Performance of the MPAs

This section discusses the performances of the different governing institutions using changes in biophysical, socioeconomic and institutional indicators.

5.2.1 Distribution of Respondents

Table 2 shows the number of key informants that were interviewed in all the study sites and the names of the barangays where the sample interviews were taken.

Table 1a. Institutional Arrangement Matrix: Essential Management Rights Practiced by DENR/NGO-Managed Sites

RIGHTS	*BIPLAS*	*SIPLAS*	*ARMNP*
Use Rights	No License Fee Research Fee – PHP 200 /researcher	No license fee User fees [a] : Docking fee PHP 200 /boat Filming – PHP 1,500 /day Sport fishing – PHP 45 /rod Research Fee – PHP 40 /day for locals and PHP 100/day for foreigners	Restricted Fishing Area/Sustainable Use Zone Fishing License Fee – PHP 1,000 /year User Fee – PHP 300 /diver/day
Exchange Rights	Research Fees are non-transferable	User fees are transferable	Licenses are non-transferable User fees are transferable
Distribution Rights	No gathering of species that are threatened, endangered or rare although not strictly monitored.	No gathering of species that are threatened, endangered or rare, although not strictly monitored.	No gathering of species that are threatened, endangered or rare
Management Rights	PAMB-DENR chaired by RED-DENR CPPAP site, partnership with BDFI, and PENRO as OIC	PAMB-DENR chaired by RED-DENR CPPAP site, partnership with SEDF	PAMB-DENR chaired by RED-DENR CPPAP site, partnership with NIPS, Inc. and WWF – Philippines
Rights to Authority	*Bantay Dagat* Volunteers	Park rangers assigned in Sohoton Control of illegal fishing in the area	PASU, park rangers and *bantay-dagat* control/regulate fishing and recreational activities
Liability		1st offense: fine of PHP 500 and/or one week imprisonment at discretion of court 2nd offense: PHP 750 and/or two weeks imprisonment 3rd offense: PHP 1,000 and /or three weeks imprisonment	A fine of not less than PHP 5,000 but not more than PHP 10,000 and/or imprisonment of not less than one year but not more than three years as implemented by PAMB.

Note: 50 PHP = 1 USD

a - User fees are only applicable to the Sohoton Blue Lagoon which is located in the Bucas Grande Island in the Municipality of Socorro.

Table 1b. Institutional Arrangement Matrix: Essential Management Rights Practiced by LGU/NGO-Managed Sites

RIGHTS	*SMR*	*TRMNP*
Use Rights	No license fees No user fees	No-take zone - no fishing license fee - user fees: PHP 2,500 /foreigner, PHP 1,250 /local for first visit (for diving) - PHP 1,250 /foreigner and PHP 625 /local for consecutive visits
Exchange Rights		User fees are transferable
Distribution Rights	No gathering of species that are threatened, endangered or rare	No gathering of any type of species both for tourists and fisherfolk, except for scientific purposes
Management Rights	PAMB-DENR co-chaired by RED-DENR and Sagay Municipal Mayor	PAMB-DENR chaired by Palawan governor active partnership with WWF- Philippines
Rights to Authority	Park rangers patrol the area and enforce park laws	LGU and NGO through WWF-Philippines regulate, enforce and patrol the area
Liability	Fine of not less than PHP 5,000 but not more than PHP 500,000 and/or imprisonment of not less than one year but not more than six years	Fine and/or imprisonment

Note: 50 PHP = 1 USD

Table 1c. Institutional Arrangement Matrix: Essential Management Rights Practiced by Community-Managed Sites

RIGHTS	*PI*	*BLCC*	*AIMS*
Use Rights	No license fees No user fees	No license fees No user fees	No-take zone for sanctuary - no fishing license fee - user fees: PHP 150 /diver/day in the sanctuary PHP 75 /diver/day outside sanctuary and PHP 50 /underwater camera when diving
Exchange Rights			User fees are transferable
Distribution Rights			No gathering of any type of species in the sanctuary, small-scale extraction for the rest of the MPA
Management Rights	DENR–CENRO, aided by BIDEF	DENR–CENRO, aided by SACRED	Marine Management Committee till 1996 PAMB-DENR under CEP-DENR, present
Rights to Authority	CENRO, LGU support and community volunteers	CENRO with PO support	*Bantay-dagat,* volunteers from the community
Liability			Fine and/or imprisonment determined by local court; fine is exclusive of the cost of damage pursuant to DAO 25.

Note: 50 PHP = 1 USD

Table 2. Distribution of Key Informants per Study Site

	DENR/NGO		
	BIPLAS	**SIPLAS**	**ARMNP**
Name of Barangays (number of samples)	Basco* (9) Chavayan (4) Imnajbu (4) Itbud (5) San Vicente (4) Sinakan (9)	Daku (5) Del Carmen (5) Halian (11) Maribojoc (9) Pamosaingan (9)	Buenavista (22) Sta. Lucia (5) Sto. Niño (12) Poblacion (12)
Total	35	39	51
Key Informants (Number)	DENR (3) NGO (2) PO (1) LGU (2)	DENR (3) NGO (1) SOEPA (1)	DENR (1) NGO (1) PO (1)
Total	8	5	3
	LGU/NGO		
	SMR	**SI**	**TRMNP**
Name of Barangays (number of samples)	Bulanon (9) Himoga-an Baybay (9) Molocaboc (6) Old Sagay (15) Taba-ao (9) Vito (9)		Calsada (8) Tacas (4) Bantayan (15) Wahig (3) Magsaysay (5) Nusa (6) Lipot-North (1)
Total	57		42
Key Informants (Number)	DENR (2) LGU (1)		DENR (1) NGO (1) PO (1) LGU (4)
Total	3		7
	COMMUNITY- BASED		
	PI	**BLCC**	**AIMS**
Name of Barangays (number of samples)	Lomboy (7) Madangog (17) Magtongtong (16)	Da-o, San Jose (2) North, San Jose (8) Poblacion,Biri (9) Poblacion, Rosario (6) Sabong-Tabok,Lavezares (3) San Antonio, Biri (9) Sto Niño, Biri (3)	Apo Island (45)
Total	40	40	45
Key Informants (Number)	DENR (2) LGU (1) NGO (1)	DENR (2) NGO (1) PO (1)	DENR (1) LGU (1) PO (1) Academe (2)
Total	4	4	5

5.2.2 Description of Household Respondents

The household (HH) survey showed that most of the respondents from all the study sites have many similar characteristics. The respondents were mostly married. In terms of age, the respondents were within the range of 30-39. Elementary education was the highest educational attainment for most of the respondents.

The average household size ranges from four to six (4-6). The number of dependents per household was within 1-3 range. The dependents were those living in the household aged 18 years and below (Table 3).

5.2.3 MPA's Performance under Different Governing Institutions Based on Biophysical Indicators

Most of the Key Informants (KIs) said that ever since the sites became PAs their biodiversity was amplified and an increase in the volume of fish catch was observed.

Household respondents claimed that the volume of fish catch was actually declining for all the study sites through the years. The respondents were asked to list the species caught according to trend and usage in each study site. There are certain contradicting scenarios in the list of species, which make analysis difficult. For example, in the Apo Island Marine Sanctuary (AIMS), jackfish is listed as a new species. However it is also listed in the category of dwindling species. This happened because the listing of fish species was based on the recollection of different fisherfolk, and each fish identified by a fisherman might be different from another.[4]

In the species listing of fisherfolk from DENR/NGO managed MPAs, the grouper tops the respondents‘ list of dwindling species. The same fish species was also listed in the categories of species that are used for economic and subsistence purposes. Since the grouper is dominantly caught for economic and subsistence purposes, it is expected that the species is indeed dwindling in numbers. Other fish species that were prominently listed include emperors and mackerels. Tuna fish is dominant in the waters of ARMNP. Fisherfolk in this area catch this fish for economic and subsistence purposes.

Data collected from existing literature, specifically studies done by WWF – Philippines and Silliman University, showed similar results. A number of marine species have been

[4] During the interview survey, with regards to the question of the type of species found in the area, a picture book of marine species entitled *"*Marine Life of the Philippines and the Indo-Pacific*"* was used. This aided the interviewers in determining the exact species that the fisherfolk were enumerating, as different regions/areas have different names for marine species.

dwindling through the years but the literature did not specify what marine species are getting fewer through the years.

Table 3. Percentage Distribution of Household Respondents by Different Characteristics

CHARACTERISTICS	DENR/NGO			LGU/NGO		COMMUNITY-BASED		
	BIPLAS N=35	SIPLAS N=42	ARMNP N=51	SMR N=57	TRMNP N=42	PI N=40	BLCC N=40	AIMS N=45
Household Size								
0	0	0	4	2	5	0	0	20
1-3	29	24	16	18	12	20	12	49
4-6	54	43	45	47	36	43	50	27
7-9	1	21	16	28	33	35	28	4
10-above	0	12	6	5	12	2	10	0
missing	0	0	14	0	2	0	0	0
Total	100	100	100	100	100	100	100	100
No. of Dependents								
0	37	21	14	13	24	25	18	22
1-3	49	41	45	40	41	48	45	54
4-6	11	26	26	40	29	22	30	24
7-9	3	10	2	5	5	5	5	0
10-above	0	2	0	0	0	0	2	0
missing	0	0	14	2	2	0	0	0
Total	100	100	100	100	100	100	100	100
Age								
18-below	0	0	0	0	2	0	0	7
19-20	0	0	4	0	0	0	0	13
21-29	17	14	10	7	17	15	12	27
30-39	43	17	45	32	48	30	28	31
40-54	31	52	28	44	19	28	38	18
55-above	9	17	14	17	14	28	22	4
Total	100	100	100	100	100	100	100	100
Civil Status								
Single	26	8	8	3	21	18	8	53
Married	71	88	82	93	60	80	92	45
Widow	3	2	0	2	0	2	0	0
Others	0	2	10	2	19	0	0	2
Total	100	100	100	100	100	100	100	100
Level of Education								
Elementary	8	43	57	47	45	50	25	60
High School	43	21	35	10	38	25	35	38
College	26	5	0	2	5	7	5	2
Missing	0	0	0	37	7	0	0	0
Others	23	31	8	4	5	18	35	0
Total	100	100	100	100	100	100	100	100

As for the species composition in DENR/NGO managed areas, there are fewer species identified under the without-MPA scenario compared with the with-MPA scenario. Besides coral reef systems, mangroves and bird sanctuaries have been added to the list of habitats in the protected areas. The greater diversity in species identified under the with-MPA scenario could, however, be due to the presence of knowledgeable and skilled manpower (skilled divers and marine biologists) assigned to the area when it became an MPA.

Coral cover for ARMNP in the beginning was at 50%, but in the with-MPA scenario it was only 33%. The continuing illegal activities in the area as well as the El Niño phenomenon in 1997, have tremendously affected the country‘s coastal resources, and thus, led to this trend.

The results of the biophysical performance assessment for LGU/NGO managed sites showed that more species are being monitored in the area with-MPA scenario. The WWF Philippines‘ office in Palawan for TRMNP conducts an annual biodiversity assessment, which started in the year 2000. This guarantees the availability of fresh biological resource data in the area.

In the community-based managed sites, coral cover has decreased, which may be caused by extreme weather condition-El Niño phenomenon in 1997. Again, the with-MPA scenario seems to correlate with higher resources available in the area. Currently, the conditions for most of the habitats are excellent, recovering and are in good health.

5.2.4 MPA's Performance under Different Governing Institutions Based on Socioeconomic Indicators

The socioeconomic indicators of performance include: household income, fishing income, alternative livelihood opportunities, and the level of environmental awareness in the community.

Household Income

Generally, results show no significant change in the household income for all study sites. The KIs from community managed sites observed an increase in the community's income but no figure was presented to show the percentage of such increase. KIs for both DENR/NGO and LGU/NGO managed sites reported no significant change in household income even after the establishment of an MPA in their areas.

According to the survey conducted on local fisherfolk, the average real household income per month in DENR/NGO managed sites is relatively close (PHP 2,936 or USD 58.72) to income derived by fisherfolk from the community-based MPAs (PHP 2,933 or USD 58.66). Income from the LGU/NGO managed study sites is lower at PHP 1,852 (USD 37.04). Respondents from TRMNP have the lowest average monthly income because

they are too far from economic centers, or from provincial capitals compared to the other study sites. The municipality of Cagayancillo lies in a remote part of the Sulu Sea.[5]

In terms of household vis-à-vis fishing income, most of the respondents from all sites fell within the PHP 2,001-3,000 (USD 40 – 60) monthly income per household range. As most of the respondents were fisherfolk, fishing is their main source of income. Few respondents from TRMNP declared any income data and those who did reported a very low income-range of PHP 0-500 (USD 0 – 10). Table 4 shows the percentage distribution of household respondents by household income, fishing income and alternative livelihood opportunities.

Fishing Activities in the Study Sites

Table 5 shows the characteristics of the respondents in relation to fishing activities. In DENR/NGO run MPAs, most of the respondents used hook and line in catching fish. Sixty-seven percent of the respondents said that fish catch has decreased over the past years. Most of the respondents attributed the continuing environmental degradation of the area to this decline.

Unlike in DENR/NGO managed sites, 40% of the respondents from LGU/NGO study sites used fishnets and an average of 31% used multiple gears. This trend was attributed to several reasons: 26% of SMR respondents attributed it to over fishing and 24% of the respondents from TRMNP attributed it to the area being declared as protected and the rules and restrictions that came with it. Hook and line was dominant among the fishing gears used in community-based managed MPAs and many of the respondents used fishing gears as well. The respondents' fish catch has generally decreased, and they attributed this to competition. In AIMS, the respondents blamed the increasing number of scuba divers in the area for the decline in their fish catch, believing that they scared the fishes away.

Several studies done on each site also enumerated similar gears and fishing technologies used by the fisherfolk, affirming the respondents‘ findings. An example of such a study was done by Silliman University where they accounted for the type of fishing gears used by the fisherfolk in AIMS. The results were similar to those listed in the table.

[5] The value of Consumer Price Index used was 146.3 (1999) in computing real household income.

Table 4. Percentage Distribution of Household Respondents by Household Income and Employment

CHARACTERISTICS	DENR/NGO			LGU/NGO		COMMUNITY BASED		
	BIPLAS N=35	SIPLAS N=42	ARMNP N=51	SMR N=57	TRMNP N=42	PI N=40	BLCC N=40	AIMS N=45
Household Income								
0-500	0	2	0	0	12	5	0	7
501-1000	11	2	0	2	7	10	0	2
1001-2000	14	8	4	19	7	12	15	16
2001-3000	3	50	49	58	12	50	35	22
3001-5000	17	17	31	5	0	12	22	18
5001-above	49	21	12	16	2	10	28	33
	6	0	4	0	60	0	0	2
Total	100	100	100	100	100	100	100	100
Average Real HH Income[a]	3,872	2,302	2,633	2,279	1,424	1,846	3,119	3,835
Fishing Income								
0-500	6	12	0	0	7	25	15	9
501-1000	11	14	2	14	10	30	12	18
1001-2000	14	19	16	30	10	25	20	27
2001-3000	35	24	35	35	0	12	25	16
3001-5000	6	21	40	9	0	8	22	7
5001-above	17	10	4	10	0	0	5	16
	11	0	4	2	73	0	0	9
Total	100	100	100	100	100	100	100	100
Employment								
Fisherman	50	72	85	87	71	60	62	68
Boatman	0	2	10	2	0	1	2	16
Tourism-related	2	0	0	2	0	0	0	3
Government Official	7	2	0	2	0	1	34	0
NGO/Social Worker	0	2	2	7	0	0	0	0
Academe	3	2	0	0	0	0	0	0
Businessman	0	0	0	0	0	6	2	0
Others	38	20	3	0	29	32	0	13
Total	100	100	100	100	100	100	100	100

Note: a – Values are in PHP (50 PHP = 1 USD)

HH – Household

Table 5. Percentage Distribution of HH Respondents According to Fishing Methods Used, Fish Prices, Fish Catch and Attributes of Change in Fish Catch for Each Study Site

CHARACTERISTICS	DENR/NGO			LGU/NGO		COMMUNITY BASED		
	BIPLAS N=35	SIPLAS N=42	ARMNP N=51	SMR N=57	TRMNP N=42	PI N=40	BLCC N=40	AIMS N=45
Fishing Method Employed								
Hook and Line	9	38	65	32	7	45	22	49
Fish Nets	31	10	6	40	41	10	35	4
Fish Cage	0	2	0	0	0	0	0	0
Others	6	14	12	14	0	20	18	0
Multiple Method Used	54	36	12	12	50	25	25	47
Missing	0	0	6	2	2	0	0	0
Total	100	100	100	100	100	100	100	100
Fish Prices (ave/kilo) in pesos								
Without MPA	54	21	29	35	15	31	30	36
With MPA	73	44	41	57	25	56	56	59
Trends in Fish Catch								
Increase	31	2	8	5	5	12	10	20
Decrease	29	93	78	84	71	73	85	67
No Change	34	5	14	11	24	10	5	13
Missing Values	6	0	0	0	0	5	0	0
Total	100	100	100	100	100	100	100	100
Reasons for Change in Fish Catch								
Management System	3	0	2	2	2	0	0	0
Financial Resources	0	0	8	0	2	0	0	0
Envt'l. Degradation	3	55	4	5	10	30	30	0
Protected Area	11	0	31	2	24	2	2	7
Fishing Gear	11	5	0	0	0	8	8	0
Natural Process	3	7	2	17	2	8	8	20
Tourism	0	0	0	0	0	0	0	42
Competition	6	7	6	16	0	32	32	11
Overfishing	20	5	4	26	0	0	0	2
Multiple Reason	6	19	31	23	31	12	12	2
No Reason	37	2	12	9	29	8	8	16
Total	100	100	100	100	100	100	100	100

Note: HH= household

Level of Environmental Awareness

The Key informant interviews also provided information necessary to formulate a general assessment of the level of environmental awareness of the members of the community. Generally, for all sites, KIs have noticed an increase in environmental awareness in the community. For ARMNP, however, none of the three KIs interviewed identified a change in the level of environmental awareness in the community. This statement is non-conclusive as it is refuted by the results obtained from the household respondents. The study conducted by Francisco et al. (2001) identified a significant change in the level of environmental awareness in the community. The contradiction may be a consequence of the small number of KIs interviewed from ARMNP.

There were several other questions that addressed the topic on environmental awareness. One such query was addressed to both the KIs and household respondents on why they thought biodiversity was important. A total of 21 KIs out of 45 from all study sites said that it helped in sustaining livelihood resource in the area. Nineteen out of 45 of the KIs said that it stabilized the ecosystem.

For household respondents, on the other hand, there was an overwhelming agreement from all sites that biodiversity is very important. Forty percent of the respondents in DENR/NGO managed sites said that biodiversity was a source of income, and that it stabilized the ecosystem and promoted tourism in the area. The same is true for 48% of the respondents from LGU/NGO sites and 32% from community-based managed sites. In all sites, though, not all believed that biodiversity contributed to alternative livelihood source or gave any form of aesthetic value.

Household respondents were also asked if they have prior knowledge that the community is part of a marine protected area. Most of the respondents in all sites were aware that it was protected. However, for TRMNP and BLCC, the level of awareness was low. The respondents acknowledged that there were restrictions in the area, but the term –protected area" was not associated with it.

On average, 72% of the respondents from the DENR/NGO managed MPAs attended seminars while 60% were able to read environmentally-related materials. With such opportunities, these respondents were able to learn many aspects of biodiversity conservation and environmental protection. In LGU/NGO managed sites, for TRMNP, 67% of the respondents were aware that the reef was declared a protected area, although they were not able to attend environmental-related training or workshop or read related materials. A similar scenario was presented for SMR.

In community-based MPAs, almost all the respondents knew that their island was declared protected. For AIMS, this level of awareness did not come from training and workshops or reading materials, but it could be attributed to its small land area. The presence of Silliman University in the area and its continuous campaign for the importance of the marine sanctuary has effectively increased the awareness of the community.

Generally, at the household level, ARMNP catches the most number of fish with 35 kilos/household during the peak season followed by BLCC with 21.7 kilos/household. The fishing technologies used are relatively the same for all sites. This is the same for the community level. Alternative livelihood sources such as seaweed farming and livestock-raising are common in all sites. At the park level, most study sites incur income from tourism with TRMNP having the highest earned revenue of PHP 1,626,425 (USD 32,528.5).

5.2.5 MPA's Performance under Different Governing Institutions Based on Institutional Indicators

The following paragraphs discuss the impacts of MPA on certain institutional indicators that include the aspects of the management board, leadership style, monitoring and law enforcement as well as the respondents‘ views on the effect of the managing institutions that govern protected sites.

Most of the respondents in all the sites were in favor of the protected area to be used to manage marine resources. Fisherfolk in DENR/NGO managed sites, specifically for BIPLAS and SIPLAS found that protected areas aid in the long-term increase in fish catch and found no direct disadvantages. However, for ARMNP, 39% found that protected areas contributed to biodiversity conservation but deterred economic growth, with the subsequent decrease in fish catch. Most of the respondents from DENR/NGO study sites were in favor of the existing management scheme in the area and most contributed its success to the leadership skills of the management committee members.

In TRMNP, 55% of the respondents felt that the establishment of protected areas contributed to the subsequent increase in fish catch. It is interesting to note that respondents who were not in favor of such an establishment saw that protected areas deterred fish catch, which was the opposing viewpoint of those who were in favor. With regards to the respondents‘ reaction on the management scheme employed in Tubbataha Reefs, a 50-50 stand resulted, many of whom saw funding sources as a key to either the success or failure of the management. In SMR, 51% believed that fish catch would increase in the long term due to the establishment of a PA in the area and 65% saw no disadvantage in having a PA.

The respondents from DENR/NGO managed sites favored the establishment of a protected area in the site and at the same time supported the existing management scheme. This could be because of the high rate of attendance of respondents at information campaigns conducted in the area. Compared with SMR, respondents from TRMNP were indecisive on their reactions to the Tubbataha Reef as a protected area. With regards to AIMS, most of the respondents were aware of the value of a protected area; the conflict was in their unfavorable perception of the PAMB management scheme.

During the interview, many expressed their desire for the Apo Island to revert to a community-based managed area. For BLCC, most were not in favor of the existing management (63%). On the other hand, an overwhelming 70% of the respondents from PI favored the existing management scheme in the area.

Table 6 reflects the most favored management institution choice of all sites. Most of the respondents (32% from SIPLAS and 33% from ARMNP) were in favor of DENR to govern the area. However, 38% from BIPLAS favored the PO/community. Fifty-eight percent of TRMNP respondents believed that PO/community was the most effective institution to handle the marine resource. Sixty-five percent of the respondents from SMR were in favor of the LGU managing the area. For PI, the choice institution was the PO/community at 45% while in BLCC (35%), respondents preferred the DENR. As expected, the majority of AIMS respondents were in favor of PO/community management. The community resented the current management and strongly believed that the decade long community management scheme before PAMB was installed was better and more effective.

These results can be attributed to several factors. For ARMNP and SIPLAS, the areas are still young MPAs, and respondents consider that the DENR with NGO support doing a *so-far, so-good* job would like its management to continue in the area. With respect to BIPLAS and TRMNP, respondents favor the PO/community to handle the areas, but it should be emphasized that this type of regime in TRMNP has not been officially assessed and evaluated. AIMS, on the other hand, has tested PO/community type of management and can be assured of its success.

As for data obtained from existing literature, the DENR/NGO managed sites' performance with institutional indicators have generally improved in the with-MPA scenario over that of the without-MPA scenario. The presence of structures for management - lighthouse, ranger station, lookout tower and others - aid in more efficient monitoring of the area. There were also more laws that were implemented when the MPA was established.

Similarly, community-based managed MPAs, have improved in the with-MPA scenario. This is seen in AIMS where management tools like dormitory building, lookout tower and multipurpose hall, aid in monitoring and enforcement activities of the management committee. However, these tools were not well maintained due to lack of funds for maintenance. To date, 75% of the Integrated Protected Area Fund (IPAF) due to the management of the park has not been released for the last two years. The community members used to do volunteer work as *bantay dagat* until the National Integrated Protected Areas System (NIPAS) was established. B*antay dagat* volunteers now receive monthly wages; however, they have not been paid their monthly dues since the first quarter of 2001. With this shortcoming, the *bantay dagat* team has no interest to continue patrolling the area. The unreleased funds generates some hostility in the area, leading people to clamor for Apo Island to be reverted back to a community-based resource management scheme where the people can access easily the resources due to them.

Table 6. Percentage Distribution of Household Respondents to Preferred Institution to Manage MPA

CHARACTERISTICS	*NG-DENR*	*LGU*	*NGO*	*PO/ COMMUNITY*	*OTHERS* [a]	*TOTAL*
DENR/NGO						
BIPLAS	35	13	14	38	0	100
SIPLAS	32	4	28	32	4	100
ARMNP	33	15	27	26	0	100
LGU/NGO						
SMR	9	65	0	17	9	100
TRMNP	14	7	7	58	14	100
COMMUNITY						
PI	32	20	2	45	0	100
BLCC	35	19	4	25	17	100
AIMS	10	12	0	73	6	100

Note: a - Refer to combination of all institutions.

There was limited information on the transaction costs incurred by various parties in the various study sites. Transaction costs include costs of information dissemination, communication activities and enforcement costs. As a proxy measure of transaction costs, the study made use of total meeting costs, enforcement costs and costs on Information, Education Campaigns (IECs) incurred by the management committee from each site. The expenses may be in the form of transportation costs, costs of supplies, materials and food for the meetings. Enforcement costs refer to activities that entail the monitoring and enforcement of the laws and policies of the MPAs. Data on these costs were obtained through KI interviews and records of the MPA, where available.

In the with-MPA scenario, the meeting costs for DENR/NGO managed sites average PHP 1,500 (USD 30) per meeting which totals to PHP 6,000 (USD 120) per year, since PAMB meets quarterly. Conversely, the TRMNP, as a five-member executive committee, meets every month (a WWF representative included). This committee's meeting costs PHP 250 (USD 5)/month, totaling PHP 3,000 (USD 60)/year. Adding the quarterly meeting of the PAMB - comprising 20 people/meeting, with PHP 50 (USD 1)/meeting - gives a total of PHP 4,000 (USD 80) per year, with a grand total of PHP 7,000 (USD 140) per year. However, no value was obtained from SMR since the board has not met for more than two (2) years. With regards to AIMS, PAMB meets quarterly as well and costs an average of PHP 4,000 (USD 80)/meeting, which translates to PHP 16,000 (USD 320) per year. This high cost is due to the fact that the PAMB meeting, composed of several stakeholders, is often held in Dumaguete city, the capital of the province, a two-hour trip from Apo Island. However, during the time when the community was still managing Apo Island, the meeting cost was minimal, as the members met at the committee chairperson‘s house and were sometimes offered light snacks, or none at all.

Regarding enforcement, based on KI interviews, the number of illegal fisherfolk caught has decreased. As of year 2000, 60 were caught in SMR, while none were caught in TRMNP. Those that were caught in SMR were not locals but originated from nearby islands like Cebu Island. In ARMNP, illegal fishing incidences are high; hence, there is a need to strengthen patrolling capabilities, similar to that of TRMNP. The patrol and enforcement duties carried out in TRMNP were strict but effective. To date, the last illegal activity apprehended was a Taiwanese vessel poaching in the Tubbataha waters. In SIPLAS, 16 illegal fishing incidences were recorded. For AIMS, most of the people engaged in illegal activities were often not from the community, quite similar to SMR. They were usually fisherfolk from nearby island provinces who were tempted to fish in the richer waters of the protected area.

One notable fact was that most of the available data were found in the scenario of a with-MPA. Perhaps, with the establishment of an MPA, institutions gained not only the skills and knowledge to identify and collect these data, but also the financial capacity to carry out these types of activities as well.

5.2.6 Management and Conservation Issues in the MPAs

The KIs from all the study sites were also queried on the current problems faced by the protected area. Table 7 shows the distribution of KIs on several management and conservation issues. The value indicates the number of KIs that responded to the choices enumerated.

So far, ARMNP informants do not see financial resources dwindling soon as compared with the other two DENR/NGO sites since it is currently funded by the Global Environmental Facility – World Bank (GEF-WB), assuring a steady flow of funds, albeit short term. On the other hand, KIs from community-based managed PAs identified lack of steady financial resources as one of its major problems. While KIs from LGU/NGO managed sites identified ineffective management system as a problem, KIs from all sites acknowledged that hostility in the areas is a problem. This community hostility was contextualized to mean uncooperative behavior of community members through non-participation in training and focus group discussions. According to the KI interviews this must be improved and solved in all institutions engaged in managing the PA sites.

Table 7. Distribution of Key Informants on Several Management and Conservation Issues for Each Study Site

	DENR/NGO			LGU/NGO		COMMUNITY BASED		
	BIPLAS	**SIPLAS**	**ARMNP**	**SMR**	**TRMNP**	**PI**	**BLCC**	**AIMS**
Problems Currently Faced by MPAs								
Ineffective Management System	2		1	1	4		1	1
Financial Resources	5	5		1	3	2	3	3
Continuos Environmental Degradation				1	1		1	
Community Hostility/Uncooperative Attitude	1	1	1		1	2	1	1
Level of Enforcement	1	4	1		1	2	1	
Others	3[a]	1[b]	2[c]	1[f]	2[g]	1[i]	3[j]	
Major Changes in the Site Since It Became an MPA								
Increased Fish Catch		2	2	3	3	4	2	4
Biodiversity Enhancement	4	2	3	2	5	4	2	1
Increased Level of Envt'l. Awareness	5	3		1	4	3	3	1
Increased Income for Community	2	1		1		1	2	3
Enhancement of Ecotourism	2	4	2		2	2	1	4
Community Hostility	2		2		3			
Others	3[d]	2[e]		2[h]		3[k]	1	2

a. refers to industrialization, lack of equipment for biodiversity monitoring and lack of support from NGO

b. refers to politics and phasing out of CPPAP

c. refers to the lack of coordination with the LGUs and the conflict between NIPA and PASu's office

d. refers to decrease in illegal fishing

e. refers to increase level of awareness and decrease illegal activities

f. refers to lack of equipment used for monitoring

g. refers to lack of equipment for biodiversity monitoring and there are no problems in the MPA

h. refers to decrease in illegal fishing and continuous community organizing

i. Refers to buoy maintenance and awareness of people

j. refers to lack of support from NGO, lack of equipment for biodiversity monitoring

k. refers to increase in fish sizes, PO's are more involved and organized and

5.2.7 Overall Assessment of MPAs as a Conservation Tool

Table 8 shows the overall assessment of the respondents on MPA as a conservation tool. The respondents were asked to rate the performance of the PA in the different sectors, whether it was poor, good, excellent, needs improvement or none. A poor rating means that the PA had generally decreased the level of welfare of the sector; a good rating implies that the PA has somehow uplifted the situation in the area; excellent would mean that the effect of the PA on the sector has surpassed all initial expectations and the results have generally lifted the situation to a better level. If the respondent believed that the PA needs improvement, it implies that the PA has affected the sectors, however minimal it may be. A _No change' rating would fall in the other category in the table.

Generally, the respondents from all the eight MPA sites considered the establishment of a PA on the environment as good. The effect of an MPA on the local community as well as in the country was judged as good. This result suggests that marine protected areas have at different levels increased the welfare of the community and the environment and at the same time contributed to the country's prestige in harboring rich marine resources.

As per institutional arrangement, the respondents from the DENR/NGO sites found that the MPA had a relatively good effect on the environment (72%), on the community (69%) and on the country (56%). For the LGU/NGO sites, 73% of the respondents found that the PA had a good effect on the environment while 29% of TRMNP respondents felt that the management needed improvement in governing the site. For the community-based sites, 80% of the respondents found the PA's performance to be good on the environment, 68% said that the PA had also a good effect on the community while 64% found that the PA had a good effect on the country.

Table 9 exhibits the key performance indicators at the park level and presents the park revenues where available. A comparison of income figures is not really feasible as the period in which these were earned were not readily available. Data simply reflect the revenue on hand of the few MPAs where such information were found. ARMNP, a DENR/NGO managed site, has an earning of PHP 226,445 (USD 4,528.9) for a six-month period. The community-based AIMS earned PHP 692,445 (USD 13,848.9) as of July of 2001. The LGU/NGO managed TRMNP has so far earned more than PHP 1.5 million (USD 30,000) perhaps due to their user fees charged in dollar rates. These earnings are often used for conservation projects in the area that include IEC campaigns, training, biodiversity assessment and equipment acquisition. The park revenues generated from ecotourism related activities proved to be profitable as it serves as a steady source of income for the management institution. The influx of tourists and resource users, however, may result in the degradation of the area if the park officials do not regulate it properly.

Table 8. Overall Assessment of Protected Area Performance as Determined by the Respondents for Each Study Site

CHARACTERISTICS	DENR/NGO			LGU/NGO		COMMUNITY BASED		
	BIPLAS N=35	SIPLAS N=42	ARMNP N=51	SMR N=57	TRMNP N=42	PI N=40	BLCC N=40	AIMS N=45
Environment								
Poor	0	2	0	2	0	2	0	7
Good	69	62	84	86	60	85	78	78
Excellent	8	5	16	7	7	8	10	0
Needs Improvement	17	31	0	5	29	2	0	7
Others	0	0	0	0	2	2	2	4
Missing	6	0	0	0	2	0	10	4
Community								
Poor	0	0	6	3	0	5	0	27
Good	69	64	75	88	88	72	75	56
Excellent	8	2	0	5	2	12	7	4
Needs Improvement	14	33	18	2	10	5	0	2
Others	3	0	2	2	0	5	7	7
Missing	6	0	0	0	0	0	10	4
Country								
Poor	3	2	4	0	0	0	0	7
Good	51	69	49	75	86	65	55	73
Excellent	17	9	14	6	0	8	13	2
Needs Improvement	0	12	6	0	12	2	0	13
Others	23	7	4	19	2	25	22	10
Missing	6	0	0	0	0	0	10	0
Total	100	100	100	100	100	100	100	100

Table 9. Summary of Key Performance Indicators at Park Level for All Study Sites

INDICATORS	DENR/NGO			LGU/NGO		COMMUNITY BASED		
	BIPLAS	**SIPLAS**	**ARMNP**	**SMR**	**TRMNP[b]**	**PI**	**BLCC**	**AIMS[c]**
Ecotourism Benefits Number of Tourists	n.d.	n.d.	871[a]	1,000[a]	645	n.d.	n.d.	5,038
Park Revenues (fees from entrance, diving, snorkeling, video, anchoring etc.)	n.d.	n.d.	226,445[d]	n.a.	1,626,424	n.a.	n.a.	692,445
Budget Per Year USD PHP	83,200 4,160,000	60,000 3,000,000	57,600 2,880,000	60,000 3,000,000	35,000 1,750,000	6,000 300,000	4,000 200,000	55,000 2,750,000
User Fees (USD)	4.00/researcher	None	6.00/diver/visit	None	25/local diver 50/foreign diver	None	None	1.50- 2.0/diver/visit
Institutional Organizations in the Area	DENR,BDFI	DENR, SEDF	DENR, NIPA, Inc. WWF-Phils., POs	DENR, LGU	DENR, LGU, WWF-Phils. PO	DENR, LGU, BIDF, PO	DENR, SACRED, PO	DENR, LGU, PO, Silliman University
Number of Illegal Fishermen Caught (as of 2001)	2	16	10	60	0	11	4	3

Notes:

a -as of 1999 and 2000 data, respectively

b -as of May 2001

c -as of July 2001

d -January to June 2000

Monetary Values: 50 pesos = 1 USD

n.a. – not applicable

n.d. – no data

The park areas have a carrying capacity level, which can only accommodate a certain number of visitors inside the park. User fees in AIMS are very minimal compared to the other MPAs that use this pricing scheme, thereby attracting the most number of tourists and scuba enthusiasts.

With the establishment of an MPA, there was better data collection and information organization in the sites. The MPA status also entitled the staff to undergo needed training activities to make them better resource managers.

5.3 Ranking of Performance Indicators by Key Informants

A group of Key Informants, representing different stakeholders, was asked to rank the different performance indicators, i.e. the biophysical, the socioeconomic and the institutional indicators, to assess which one is more important to them in judging the performance of an MPA. They were likewise asked to rank the various indicators in each of these three broad categories of impacts. Subsequently, the Kruskal-Wallis test was used to arbitrarily give weight on the performance indicators and also to test whether the rankings are significantly different from each other.

The results for the Kruskal-Wallis test show that generally the KI respondents ranked socioeconomic indicators as first, biophysical, second and institutional indicators as third.

Table 10 shows the ranking results for each of the management institutions. For the DENR/NGO led marine sites, the socioeconomic indicators were ranked first, biophysical a far second and institutional indicators as third. For the LGU/NGO sites, the KIs ranked biophysical as one (1), while, socioeconomic and institutional indicators were equally ranked next. For the community-based MPA, socioeconomic indicator and biophysical category were ranked the same and institutional indicator was ranked third.[6]

The same table presents overall ranking of the different sub-categories of the performance indicators. These are the computed mean ranks for each of the categories for all sites. For the biophysical indicator, the species composition is ranked one (1), the number of habitats was second and the kind of fishes was ranked last.

With regards to the sub-categories for the socioeconomic indicators, the table only shows the top five (5) mean ranks, although initially, there were 13 indicators. Provision of alternative livelihood is the most important criteria followed by household income. For the sub-categories of the institutional indicators, the laws/regulations category was ranked one (1) and the management board, second; the monitoring and enforcement was a third.

[6] The 10% significance level was used instead of the usual 5% since the sample size is small.

Table 10. Kruskal-Wallis Test-Mean Ranks for Key Performance Indicators Ranking

CHARACTERISTICS	DENR/NGO N=9	LGU/NGO N=6	COMMUNITY-BASED N=11	OVERALL N=26
Biophysical Indicators	**14.56**	**7.50**	**16.00**	**37.08**
Species Composition	12.00	5.50	19.00	35.46
Number of Habitats	12.56	12.50	15.00	38.85
Kind of Fishes	17.44	10.50	17.00	44.19
Socioeconomic Indicators	**10.67**	**10.50**	**16.00**	**36.23**
Access to Information	46.94	25.00	78.77	150.75
Amount of Fish Catch	47.39	33.08	87.23	167.25
Household Income	48.7216	40.50	46.45	134.38
Livelihood Alternative	58.39	28.00	45.59	132.10
Financial Aid	78.22	41.75	77.59	196.12
Institutional Indicators	**16.78**	**10.50**	**19.00**	**45.19**
Management Board	15.00	6.50	17.00	37.50
Monitoring & Enforcement	14.00	11.50	25.00	49.50
Laws/Regulation/Ordinances	13.00	10.50	9.00	31.50

5.4 Assessment of Best MPA Study Site

Tables 11a and 11b show a comparison of indicators across sites. For biophysical indicators, the LGU/NGO managed sites of SMR and TRMNP has the highest number of coral genera and the highest number of fish species, respectively. In the aspects of socioeconomic, household income is highest in BIPLAS, a DENR/NGO site followed closely by AIMS, a community-based managed site. In terms of the amount of fish catch, ARMNP leads the three sites, with an average of 35 kg of fish catch per day. For institutional indicators, it is worthwhile to note that based on the study's general assessment, the management board of TRMNP is the most active. At a glance it seems that all sites fared well in terms of performance but the study cannot readily judge the best MPA based on these values and listings. In order to aid assessment, a composite index was generated to systematically determine the best performing MPA. Different weights and institutional rankings of indicators were employed, based on those given by the key informants themselves.

Table 12 illustrates the results of the ranking and composite indices for each performance indicators. Initially, given the values and data presented in the preceding table, the study ranked the variables from a scale of one (1) to five (5), where five (5) is the highest. For example, the highest number of coral species was noted in the LGU/NGO managed site of SMR meriting a rank of (5). TRMNP has the second highest number of coral species and was given a rank of four (4). Thus, the ranks of five (5) and four (4) were assigned to SMR and TRMNP, respectively, since there is not much difference in the total number of species between the two LGU/NGO managed sites. This same process was conducted for all variables. The ranks were given based on the range of values of the parameter under investigation.

After ranking the values for each of the performance indicators, the ranks were then multiplied by the weights of importance attached to the indicators (which were also given by the key informants). The overall performance index was thus generated as presented in Table 12. For the biophysical performance indicators, the LGU/NGO managed sites of SMR and TRMNP were able to obtain the highest index of 1.87 and the community-based managed sites ranked second with an index of 1.05. However, for socioeconomic indicators, the DENR/NGO managed sites scored the highest at 1.71 and the community-managed sites were second with 1.05. In the aspects of institutional performance indicators, again, the LGU/NGO managed sites together with the community-managed sites were first, garnering a value of 1.20

From these values the study concludes that the LGU/NGO managed sites of Sagay Marine Reserve and Tubbataha Reef Marine National Park were the best among the MPAs, with an average total composite index of 3.79 compared to the other study sites. DENR/NGO sites garnered an index of 3.53 and the community-based led sites with 3.30. However, the non-statistically significant differences between these values do not make it possible to rate one governing institution as better MPA manager than another. One might say, however, that the scores obtained for all sites seem to imply that the MPAs are performing well in all aspects, with scores close to 5.0. This result is an important indication that MPA is a good conservation tool in managing coastal resources in the country.

Table 11a. Summary of Performance Indicator Values for Each Study Site

CHARACTERISTICS	DENR/NGO		
	BIPLAS	SIPLAS	ARMNP
Biophysical Indicators			
Species Composition			
Coral Species (Genera)			34
Fish Species		106	148
Number of Habitats		2	2
Kind of Fishes (Family)			24
Socioeconomic Indicators			
HH Real Income (ave/month)	3,872	2,302	2,633
Access to Information/Training	63%	88%	65%
Amount of Fish Catch(kilo/day/HH)	11.5	8.2	35
Financial Aid*	Yes	Yes	Yes
Livelihood Alternative	Wildlife collection, non-timber, livestock, forestry and farming	Livestock, poultry raising, wood gathering, trading and contract labor	Aquaculture, seaweed, farming, livestock raising, demo farm, iceplant
Institutional Indicators			
Laws/Regulation/Ordinances	3	3	3
Management Board	DENR-NGO(BDFI),	DENR-NGO(SEDF), POs	PAMB-DENR(RED), 15 POs
Monitoring & Enforcement	PCG Patrol boat		Patrol boats, lighthouse, ranger station, powerhouse

Note: * - refers to the presence of foreign aid/large funding from other institutions such as the World Bank

Table 11b. Summary of Performance Indicator Values for Each Study Site

CHARACTERISTICS	LGU/NGO		COMMUNITY BASED		
	SMR	TRMNP	PI	BLCC	AIMS
Biophysical Indicators					
Species Composition					
Coral Species (Genera)	56	46			31
Fish Species	58	380	68	42	126
Number of Habitats	2	1	2	2	2
Kind of Fishes (Family)		31			27
Socioeconomic Indicators					
HH Real Income (ave/month)	2,279	1,412	1,846	3,119	3,835
Access to Information/Training	32%	48%	65%	80%	42%
Amount of Fish Catch(kilo/day/HH)	12.4	5.8	5.1	21.7	13
Financial Aid*	No	Yes	No	No	No
Livelihood Alternative	Livestock raising, fish drying, grouper/squid/crab and oyster culture	Seaweed farming, agriculture, livestock, food processing	Biointensive backyard gardening, money lending, hog dispersal, plantation	Mud crab fattening, mat weaving	Mat weaving, hog dispersal, vending, resort employees
Institutional Indicators					
Laws/Regulation/Ordinances	3	5	2	9	3
Management Board	DENR-LGU, 13 POs	PAMB-DENR(Provl. Gov.) 3 POs, NGOs	DENR-LGU-NGO (BIDEF), 8 POs	DENR-NGO(SACRED, Bankaton), 2 POs	MMC PAMB-DENR(RED), 1 PO
Monitoring & Enforcement	Patrol boats, basic surveillance equipment, *Bantay dagat* (60)	Patrol boats, ranger station (PCG/PNP & WWF-Phils.)			

Note: * - refers to the presence of foreign aid/large funding from other institutions such as the World Bank

Table 12. Composite Index Ranking for Each Key Performance Indicators for All Study Sites

CHARACTERISTICS	DENR/NGO			LGU/NGO			COMMUNITY-BASED		
	Rank	Index	N=9	Rank	Index	N=6	Rank	Index	N= 11
Biophysical Indicators	3.00	0.9	30	4.67	1.87	40	3.00	1.05	35
Species Composition	2	0.8	40	5	2	40	2	0.64	32
Number of Habitats	5	1.75	35	5	2	35	5	1.75	35
Kind of Fishes	2	0.5	25	4	1	25	2	0.66	33
Sub-Total		3.05			4.75			3.05	
Socioeconomic Indicators	3.8	1.71	45	2.4	0.72	30	3	1.05	35
Household Income	4	0.92	23	2	0.32	16	4	1.28	32
Livelihood Alternative	4	0.72	18	3	0.69	23	3	0.93	31
Access to Information	4	1	25	1	0.35	25	3	0.42	14
Amount of Fish Catch	3	0.69	23	3	0.60	20	3	0.21	7
Financial Aid	4	0.44	11	3	0.48	16	2	0.32	16
Sub-Total		3.77			1.33			0.95	
Institutional Indicators	3.67	0.917	25	4.00	1.20	30	4.00	1.20	30
Management Board	4	1.28	32	5	2	45	5	1.50	30
Monitoring & Enforcement	3	0.99	33	4	1	25	3	0.60	20
Laws/Regulation/Ordinances	4	1.4	35	3	1	30	4	2.00	50
Sub-Total		3.67	100		4.15	100		4.10	
TOTAL		3.53	100		3.79	100		3.30	100

6.0 CONCLUSION

Based on the values of the performance indices, the LGU/NGO managed sites seem to be better managed than other MPAs under different governing institutions. However, the differences in performance across various groups of sites were not statistically different from each other. This result indicates that regardless of the type of institution governing the MPA, as long as its management is efficient and effective in implementing its conservation plan, enforcing its laws and sourcing its funds, a MPA can perform well. This is supplemented by the fact that the performance indices for all the study sites were high, the LGU/NGO sites (3.79), the second MPAs that performed best—DENR/NGO (3.53) and the last MPA – community-based (3.30). These are further supported by the results generated using TopDec, a decision software program, where the rating method showed that LGU/NGO managed sites exhibited the highest scale. The LGU/NGO managed MPAs with 84.36; DENR/NGO managed sites obtain a score rating of 80.44, and community-based sites with 74.45. Again, there is very little difference among the values generated.

Surprisingly, the community-based sites obtained the lowest indices refuting one of this study‘s hypotheses that CBRM scheme is more effective than other institutional arrangements. This further attests to the conclusion that one cannot generalize on the effectiveness of a particular governing institution. One institution may perform better under one site, while another may do a good job in another site.

LGU/NGO managed sites has a higher performance index because these sites face less conflict at the time of the survey. In particular, there was a high level of hostility by the community members in AIMS against the management, thus, hampering the smooth flow of the implementation of conservation laws in the area. Similarly, the DENR/NGO managed ARMNP, has a weak linkage with the LGU thus, conservation efforts are not fully implemented. LGU support is vital for a more effective implementation of the management plan for the park, as it is the administrative arm of the community where the MPA is located.

With regards to the amount of information that was gathered for the study, several data gaps exist in each site, thus the performance indicator tables were not completely filled-up illustrating that there exists different levels of data management across sites. In fact, in most cases, data collection and monitoring (both biological and socioeconomic) became institutionalized only when the areas were declared protected areas. The establishment of a marine protected area in a community has allowed capacity building to occur with the hiring of skilled and knowledgeable staff, as well as the financial inflow to implement the MPA plans. This explains the richness of data available under the with-MPA scenario.

The declaration of the area as MPA further results in improvement of the biodiversity conservation in the area as shown by the data and based on accounts of key informants. The biophysical indicators reflect that ecosystems are recovering from degradation while socioeconomic indicators show an increase in the level of environmental awareness and generation of revenues from ecotourism. Institutional strengthening is noticed through park monitoring, implementation and the enforcement of laws on conservation. The MPA management for all study sites was successful in the

construction of park facilities as well as the provision of skilled staff to facilitate efficient MPA administration.

It was also observed that fisherfolk belonging to People‘s Organizations (POs) have more access to information, and thus, could better appreciate and accept the concept of protected areas than those who are not members. Being a member tends to foster a sense of stewardship among the community that results in a more sustainable use of resources. This type of empowerment is essential to the success of any MPA. Whatever type of management exists in the area, cooperation from the community is essential, thus giving them a sense of duty that encourages easier collaboration with stakeholders. The PO chairpersons are often members of the PAMB.

Given the stakeholders‘ ranking of performance indices, the study was able to come up with a ranking for the three performance indicators. The socioeconomic indicator was ranked first, the biophysical was second and the institutional factor was third. This means that according to the representatives from different institutions, the socioeconomic impact of MPA is the most important criterion to be considered in evaluating its performance, while the biophysical factor is second and the institutional indicator is the least important. The Kruskal-Wallis test showed that although socioeconomic characteristic was ranked one, the institutions still valued highly the biophysical and the institutional categories.

The study showed that establishing an MPA is far better than not having established one. A protected area that is managed effectively will result in resource conservation, ecotourism enhancement and a more effective monitoring and law enforcement. The social and economic effects of an MPA were not fully determined by the study, due to lack of data. However this does not negate the fact that MPAs can provide economic benefits to the community, specifically through ecotourism and alternative livelihood programs. Furthermore, the study was able to establish that it is not possible to generalize on the best governing institution for MPA. This will differ depending on the situations in the fields. This result implies that the success of MPAs relies not on any specific type of institution but rather on the various elements that are found effective in managing the MPAs. These elements include human and financial resource availability and the particular policies/strategies implemented in the area.

7.0 RECOMMENDATIONS

Generally, for a small area like AIMS, it is recommended that a CBRM be established. However, for bigger areas of jurisdiction, like TRMNP and ARMNP, co-management styles may be more effective as there is a bigger pool of resources available for different protected area management activities.

As a whole, the study discovered two important lessons in protected area management. Firstly, the importance of the provision of sustainable alternative livelihood for the community, appropriate to the sites' resources and its inclusion in management plans and secondly, a protected area will be more effective if coastal resources in nearby provinces and other islands are also well protected and well managed.

The first lesson was that a community will be hostile to programs that limit their access to coastal areas, and threatens its earning capacity. Hostility is a direct result of the shift in the livelihood pattern of the community in terms of fishing methods and the volume of fish catch when the community is established as a protected area. The shift not only creates a hostile environment but also drives some of the fisherfolk to engage in illegal and destructive fishing methods and activities. This outcome deters conservation efforts.

This entails a good management scheme that will include appropriate and workable alternative livelihood for the community. It is important that alternative livelihood opportunity be introduced that is appropriate to the needs and characteristics of the community. Moreover, this thrust comes with mechanisms such as financing, knowledge to learn the livelihood and the capability to sustain it.

Linking up to a network of adjacent MPAs that are actively managed is also essential to the success of an MPA‘s conservation efforts. If there are no established MPA near an already existing protected area, there is a need to encourage others to set up one. Most of the illegal fisherfolk are from nearby provinces or islands. They are attracted to fish in a protected area because they know that its waters are abundant with marine species. They can be deterred by active cooperation and coordination among marine or coastal communities around the area, and the whole country. An active network of adjacent MPAs in effect covers a larger geographic area beyond municipal waters. Thus, law enforcers pursuing violators outside their jurisdiction can now be easily assisted by enforcers found in adjacent islands or municipalities. This strategy will encourage fisherfolk to stay within their waters and do not infringe on other vicinities.

Finally, a firm and strong collaboration between the national government through the DENR and the local government units (LGUs) must be harnessed for a more effective and sustainable conservation effort. This is especially relevant to ARMNP, BIPLAS and SIPLAS where LGU involvement is currently minimal. Although lead institutions manage the area, it is very important that a harmonious relationship is developed among these organizations. Any help that it can get is vital to the success of the MPA. The conservation of marine and coastal resources should result in biodiversity conservation, as well as to economic benefits and food security. If economic well being is secured for the host community then biodiversity conservation is ensured as well. This strategy supports the community‘s need for assurance. They buy into conservation efforts because it can result in better economic benefits. With continuous protection of the area and economic support in the form of sustainable livelihood alternatives, the community will consistently experience the benefits of the establishment of the MPA. If this is not the case then protected areas will continue to experience obstacles hindering the success of an MPA. The community is an MPA management‘s strongest ally.

Having a highly centralized and bureaucratic government, national agencies such as the DENR cannot provide all the necessary and timely support to enable MPA enforcers to effectively manage the resource; thus efforts must come from the LGU.

REFERENCES

Bromley, D.W. 1991.Environment and Economy: Property Rights and Public Policy. Basil Blackwell Ltd. Oxford, UK.

_____. 1997. Environmental Problems in Southeast Asia: Property Rights Regimes as Cause and Solution. Economy and Environment Program for Southeast Asia (EEPSEA) Biannual Workshop. May 13-15, 1997. Singapore.

Cesar, H. S. 2000. Collected Essays on the Economics of Coral Reefs. Cordio. Kalmar, Sweden.

Chou, L. M. 1998. –Status of Southeast Asian Coral Reefs" in C. Wilkinson, ed. *In* Status of Coral Reefs in the World:2000. Global Coral Reef Monitoring Network. Cape Ferguson, Australia.

Cuevas, A. 1999. A Model for Analyzing Common Pool Situations in Natural Resources: Institutional Arrangements in Fishery. Unpublished paper. University of the Philippines, Los Baños, Laguna.

Dasgupta, P. and K.G. Maler. 1994. Poverty, Institutions and the Environmental – Resource Base. World Bank Environment Paper No. 9. World Bank. Washington D.C.

Dixon, J. and L.F. Scura. 1994. An Economic and Ecological Analysis of the Bonaire Marine Park. In: Herman S.J. Cesar, Ed. Collected Essays on the Economics of Coral Reefs. Pp. 242. CORDIO, Sweden.

Francisco, H.A. et al. 2001. Socioeconomic Impact Assessment of CPPAP: Apo Reef Marine Natural Park. NGOs fro Integrated Protected Areas (NIPA) and Resources, Environment and Economics Center for Studies, (REECS), Inc. Volume II.

Gomez, E.D. 1997. Reef management in developing countries: A case study in the Philippines. Coral Reefs 16:S3-S8.

Hanna, S. and M. Munasinghe. ed. 1995. Property Rights and the Environment: Social and Ecological Issues, The Beijer International Institute of Ecological Economics and The World Bank, Washington D.C.

Hardin, G. 1968. The Tragedy of the Commons, Science, 162(1968):1243-1248

IUCN (The World Conservation Union). 2000. Financing Protected Areas - Guidelines for Protected Area Managers. Gland, Switzerland and Cambridge, UK : IUCN.

Kramer, P.A. et.al. 2000. Transients and Lethal Effects of the 1998 Coral Belaching Event on the Mesoamerican Reef System. Paper presented at the 9th Annual Coral Reef Symposium, October 23-27, 2000, Indonesia.

McNeill, S.E. 1994. The Selection and Design of Marine Protected Areas: Australia as a Case Study. Biodiversity and Conservation 3: 586-605.

McNeely, J.A. 1988. Economic and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources. IUCN. Gland Switzerland.

Rajasuriya, A. et.al. 1998. Status of Coral Reef in South Asia: Bangladesh, India, Maldives, Sri Lanka. Paper presented at the 9th Annual Coral Reef Symposium, October 23-27, 2000, Indonesia.

Riedmiller, S. 1998. The Chumbe Island Coral Park Project: Management Experiences of a Private Marine Conservation Project.

Ruddle, K. 1994. A Guide to the Literature on Traditional Community-based Fishery Management in the Asia Pacific Tropics. Food and Agriculture Organization (FAO) Fish Circulation 869. 114 p.

Schlager E. and E. Ostrom. 1992. Property rights regimes and Natural Resources: A Conceptual Analysis. Land Economics 68:249-62.6

WCMC (World Conservation Monitoring Center). 1998. Annual Report 1997. United Nations Environment Program (UNEP).

White, A.T. and A. Cruz Trinidad. 1998. The Values of Philippine Coastal Resources: Why Protection and management are Critical. Ceby City:CRMP.

White, A.T. et al. 1999. Benefits and Costs of Coral Reef and Wetland Management, Onlango Island, Philippines. Herman Cesar. ed. *In* Collected Essays on the Economics of Coral Reefs.

(WRI) World Resources Institute.1999.Coastal and Marine Resources: Marine Biodiversity. Internet Download. http://www.wri.org

(WWF) World Wide Fund for Nature. 1989. Primer on Biological Diversity.

World Wide Fund for Nature. 1999. Health Status of Tubbataha Reef National Marine Park. Cagayancillo, Palawan.

Zylicz, T. 1995. Will New Property Rights Regime in Central and Eastern Europe Serve Nature Conservation Purposes? Economic Discussion Papers No. 12. Faculty of Sciences, University of Warsaw, Poland.

Zoints, S. 1992. The State of Multiple Criteria Decision Making: Past, Present and Future. The 9th International Conference: Theory and Applications in Business, Industry and Government. Springer-Verlag New York, Inc. New York, U.S.A.

APPENDIX

GLOSSARY

AIMS	Apo Island Marine Sanctuary
ARMNP	Apo Reef Marine Natural Park
BIPLAS	Batanes Islands Protected Landscape and Seascape
BLCC	Biri-Larosa Coastal Community
CENRO	Community Environment and Natural Resource Officer
CEP	Coastal and Environmental Program
CBRM	Community-based Resource Management
CPPAP	Conservation of Priority Protected Area
CRMP	Coastal Resource Management Program
DENR	Department of Environment and Natural Resources
HH	Household
HNGO	Host Non-government organization
ICBP	International Conservation for Bird Preservation
IEC	Information and Education Campaign
IPAF	Integrated Protected Area Fund
KI/s	Key Informant/s
LGU/s	Local Government Unit/s
MCA	Multi-criteria Analysis
MMC	Marine Management Committee
MOA	Memorandum of Agreement
MPA/s	Marine Protected Area/s
NIPA	NGOs for Integrated Protected Area Inc.
NIPAS	National Integrated Protected Areas System

NGO/s	Non-Government Organization/s
PAMB	Protected Area Management Board
PASu	Protected Area Superintendent
PEACE	Philippine Ecumenical Action for Community Enlightenment Foundation
PCG	Philippine Coast Guard
PI	Panggangan Island
PENRO	Provincial Environment and Natural Resource Officer
PNP	Philippine National Police
PO/s	People‘s Organization/s
RED	Regional Executive Director
SMR	Sagay Marine Reserve
SIPLAS	Siargao Islands Protected Landscape and Seascape
TRMNP	Tubbataha Reef Marine Natural Park
WTP	Willingness To Pay
WRI	World Resources Institute
WWF	World Wide Fund for Nature Philippines